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Ghana.

MEDICAL FIELD UNITS
ANNUAL REPORT, 1961

David Scott.



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Introduction

Each year in the Introduction to the Annual Report of Medical Field Units the main objectives of the document are given together with a description of the organisation which serves as the general background against which current events must be seen. Although these objectives and this background hardly vary from one year to another some account of them must be given annually by way of introduction to the Report to make sure that new readers can best appreciate the later sections. No apology should therefore be necessary for the fact that the next five pages are similar to the corresponding part of recent Annual Reports.

The purpose of the Report

The aim of the Annual Report is not only to provide the customary account of the year's work for the Ministry of Health but to do this in a form that fulfils other useful purposes. The first of these is the need for a document that will be as widely read as possible; it should be presented in such a way that it is of general interest to all our professional colleagues in Ghana and perhaps also to laymen concerned with the development of the country. It must serve the special requirements of those working in several fields of public health, in particular it might be useful to the regional P.M.O.s. and their medical officers of health. Another group comprises workers in the field of tropical epidemiology

outside Ghana who wish to know something of the situation here, more especially international consultants and other visitors who do not have sufficient time to gain first hand experience of all aspects of their subjects during a short stay in this country. For each one of these groups a simple and up-to-date statement relating to endemic and epidemic disease investigation and control in Ghana may serve some useful purpose, particularly where it is contained within a single volume.

Such a multipurpose nature of the Report is very demanding. The first essential is that it should be made as interesting as possible, yet this must be reconciled with the need to provide a considerable amount of detail. In M.F.U. there are eight separate units and several active divisions in headquarters; as each submits its own full annual account it is clear that the composite document cannot be a complete record of the year's work. Much has to be omitted. Furthermore, the Report should be provided in such a manner as to satisfy the requirements not only of those who read it in 1962 but also of those who may have to refer to it in later years.

The presentation of facts and figures from the work of M.F.U. in 1961 is necessarily supported by much explanatory comment. Without it not only would it appear uninteresting but many would find it difficult to follow. Furthermore, the value of the observations in endemic and epidemic disease made in a particular year is much enhanced where they are seen as a progression of events from previous years, and

earlier records are used to indicate these trends more clearly and also to provide a longer period on which an assessment of the effect of a particular control measure can be based. This interweaving of impressions and the results of experience of several consecutive years is the very substance of all epidemiological studies and is essential for the analysis of the results of mass control of disease, but it leads to a bulky and somewhat discursive Report. However this procedure does not obscure the picture of the work actually performed in 1961 for it is made clear in the text which figures, and generally which observations, relate to the year under review and at the end of the Report the year's achievements in terms of disease investigation and control are summarised factually as far as this is possible.

The Report is divided into two parts. The first covers general subjects, and in order to cater for those who do not wish to read through the whole document it includes also brief summaries of the work of the separate units and provides a rapid sketch of the principal medical features, problems and progresses of the organisation as a whole in 1961. Part 2 is concerned only with the scientific and technical aspects of the work.

The background to present day M.F.U.

About 30 years ago the countries on the western side of tropical Africa had each in turn to face an epidemic of sleeping sickness which was moving across the region in a north-westerly direction. They all responded in a similar way, by setting up an ad hoc control organisation. The principle of control which was used everywhere was the mass ascertainment of the reservoir of infection in man by large scale examination of entire populations within the affected area, and then its eradication by mass treatment of the cases which had been discovered. The whole operation could be broken down into a series of separate and almost independent tasks. Selected subordinates were trained in each of these and soon became extremely efficient in their own duties for the tasks were necessarily repetitive and largely mechanical; even the operation of lumbar puncture can be carried out as a purely mechanical piece of work. A team could thus be built up which would be able on its own to carry out all the basic procedures of sleeping sickness control, in examination, in diagnosis and in treatment. This was essential for so few medical officers could be spared for this work that their time was fully taken up with the general direction and responsibility for a campaign, in training the staff and ensuring that high standards were maintained in the various techniques.

When the epidemic waned in the mid-1940s the individual governments sought to convert their monovalent sleeping sickness organisations into polyvalent services which would extend their work to the control of other diseases, for at this time several factors were urging that initial steps should be taken to deal with the great load of parasitic infection which was being borne by the people. Firstly there was the growing public realisation that much of the disease could be prevented,

and the consequent demands for control; secondly there were the great contemporary advances in medical research with the discovery of the sulphonamides, the sulphones the antibiotics and the insecticides, all being most valuable weapons for use in programmes of mass control. There could be no question of abandoning this newly found approach to some of the problems of public health just because the original objective had been largely achieved. It was clear that the organisation must remain intact and that its varied experience be exploited to deal with some of the other community diseases.

In Ghana the original trypanosomiasis campaign had been formed in Gambaga in 1937. It comprised about 30 men who were for the most part locally recruited in Mamprussi. They were trained in the elementary microscopy, in the simple record keeping and census taking that mass control of sleeping sickness demands; moreover they were accustomed to living under hard conditions in the field and became adept in establishing good public relations, traditions which have been of the greatest value as the years have passed. The change over to a polyvalent service was begun in 1951, but the process whereby an organisation concerned with the single task of discovering cases of human trypanosomiasis is converted into fact finding units of some diversity is long indeed. Even after the change in principle from unipurpose to multipurpose units had been effected this in turn was succeeded by further evolution and by further developments.

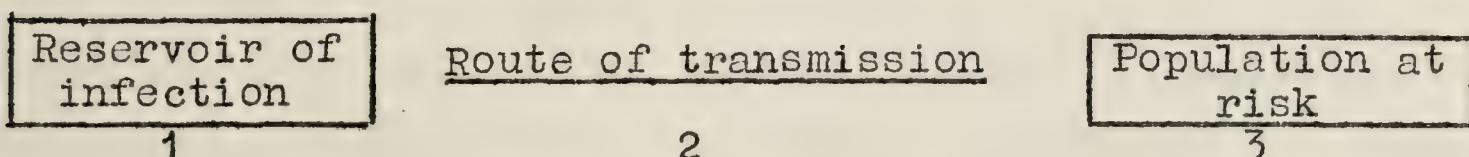
The role of M.F.U. today

Whilst most people could easily appreciate the aims and methods of the former Sleeping Sickness Service the variety of tasks now being undertaken by its successor gives the impression that this organisation has become a good deal more complex. It is true that it has been greatly expanded but the basic principles on which it operates are exactly the same as those of the Trypanosomiasis Campaign when it was formed in 1937. It would probably help in understanding our present day programmes if these fundamentals were restated for it would then be comparatively simple not only to follow the rational evolution to 1961 but to speculate in what tasks might, in the future, be added to our duties.

The first and most important job of these mobile units is to undertake the control of a particular communicable disease using specific rather than general measures for this attack. Control can be achieved either by:-

- (1) destruction of the reservoir of infection of the disease;
- (2) eradication of an intermediate host or
- (3) providing specific protection, e.g. vaccination or chemoprophylaxis for each member of the community exposed to the disease.

These methods of control can be represented graphically:-



The Sleeping Sickness Service originally used the first two methods:

1. Ascertainment of the reservoir of infection of T.gambiense in man by examination of whole populations, and its destruction by treatment of the cases which were discovered, and
2. Various systems of tsetse eradication.

Later the third method was also used when chemoprophylaxis was administered to groups of persons at special risk from the disease.

Now it is simple to understand how these systems of control can be used to deal with other infections in addition to human trypanosomiasis, but before a new disease can be added to the M.F.U. list certain conditions must be fulfilled. In the first place one or more specific measures of control must be available and it must be possible to apply these en masse, that is to say they should be fairly simple to perform and be capable of being carried out by trained subordinates: they must be effective, safe and relatively cheap. Furthermore the disease must warrant this attention. It is sometimes tempting to consider the control of some disease where all the conditions are satisfied except this last but this would mean that some element of a limited trained staff and of other resources of control are pinned down on work which, in terms of improvement of the public health, provides little yield. It is important that a properly considered award of priorities is first drawn up for the whole range of endemic and epidemic diseases.

It must never be overlooked that M.F.U. is fundamentally a service of medical auxiliaries; it cannot be otherwise where the underlying concept is to apply control measures to whole populations. Professional staff are essential, as they were for the Trypanosomiasis campaign, but it is impossible for them to carry out the procedures of examination, diagnosis and treatment where many thousands of people scattered over a very great area have to be given these attentions in a single day. A point which is frequently overlooked is that unless a system of control can be broken down into a number of separate tasks which can then be carried out by different medical auxiliaries it is unlikely that M.F.U. can make use of it.

The M.F.U. survey and treatment campaigns against yaws and trypanosomiasis will be recognised as control programmes which use the first method of attack listed above, that is to say ascertainment and destruction of the reservoir of infection. Specific protection (method 3) is given by M.F.U. in vaccination against smallpox and against yellow fever and by chemoprophylaxis against epidemic cerebro-spinal meningitis and trypanosomiasis. Finally vector control is

employed to aid the further reduction of sleeping sickness over large areas, control of S.damnosum to prevent transmission of O.volvulus is now being carried out but only in small areas and trials with molluscicides are about to begin as a first step in controlling bilharziasis.

The second task of M.F.U. is to provide treatment for patients suffering from a limited number of endemic and epidemic diseases. These cases may be found by mass surveys of populations or they may come voluntarily to M.F.U. field camps; of course their treatment must be by specific measures which, as in control, should be capable of being carried out by trained auxiliaries. In certain programmes disease control and the treatment of cases are both achieved in a single operation, this applies where the means of attack is against the reservoir of infection, the system which is principally employed in dealing with yaws and trypanosomiasis. With other diseases such as cerebro-spinal meningitis and measles their treatment by M.F.U. has no real effect in the course of the particular epidemic; with those infections control and life-saving therapy must be carried out separately.

Our third duty is to assess the vast amount of information on disease behaviour which is being collected by the survey teams in the field and to analyse the results of the various control measures which have been applied. Detailed records are made not only of those infections which are being treated or controlled but also about other endemic conditions. This data is collected in such a way that it can best be used to help define the geographical and demographical patterns of the separate diseases and to indicate the trends in their prevalences. It is in this aspect that the work of M.F.U. has expanded most in recent years, for it is of the greatest importance in planning future control programmes to appreciate what exactly are the problems that face us in dealing with endemic and epidemic disease. Only then is it possible to lay down some order of priority in which

conditions should be dealt with. As the disease intelligence service gains experience it becomes increasingly competent to interpret information coming from the field so that, on the one hand, the earliest signs of change in the behaviour of a disease can be detected and this warning acted upon, and on the other hand avoiding attaching undue importance in cases where this may in fact only be apparent and superficial.

There is a fourth service which M.F.U. provides. The Ministry of Health are aware that in M.F.U. they have an organisation which can respond to an epidemic rather as a fire brigade to a fire. Staff who are living permanently under field conditions and are organised as highly mobile teams are available for new epidemic duties at extremely short notice. These teams of medical auxiliaries orientated towards the control of disease by mass measures and having a long experience of establishing good public relations and of adjusting themselves to field conditions, provide something akin to an insurance policy against epidemic disease. Whilst the work of the control and treatment units can be seen and appreciated by everyone few people are aware of the benefits of the disease intelligence service provided by M.F.U.; it is probably that only on comparatively rare occasions will this final and latent value of the organisation be recognised.

The purpose of M.F.U. is not, as some suppose, to carry out pure research for it is essentially an organisation of medical auxiliaries having certain specific programmes of control and treatment to carry out. The techniques employed by the units are, in general, those which have already been widely accepted by expert world opinion as being the most suitable for mass application under present circumstances. Of course these are varied according to local conditions but by and large the M.F.U. - type of organisation, which until recent years was a concept rather peculiar to West Africa, works from a series of blue-prints. Although laboratory research cannot form any part of our work, what might be called

applied investigation in the field, particularly in epidemiological studies, is an important element of our duties.

The work done by M.F.U. can thus be summarised:-

1. Providing a service for the public health
 - (a) Mass prevention or control of certain communicable diseases
 - (b) Mass treatment of patients suffering from specified conditions (case finding and treatment service).
2. Provision of a disease intelligence service for the Ministry of Health.
3. To provide epidemic emergency squads where necessary.

Looking to the future

From time to time in the past M.F.U. has experienced periods of growth; these were partly due to intermittent increase in the numbers of staff and partly by an extension of the services, new diseases being added to those already being investigated or controlled. As far as the number of the staff is concerned there will probably be little need in the near future for any increase of the technical workers; but the process of extending the services can be continued for a long time to come for there is much to be done. This further expansion and evolution must, however, be continued along those lines which have already been established.

It is relatively easy to enumerate further diseases which M.F.U. might control but the final choice will be limited to those fulfilling the usual conditions, that is to say that there is both the need to deal with the infection and the means to carry it out. For example there is a most effective immunising agent against diphtheria but it could not be suggested that M.F.U. should conduct a mass campaign against the disease since there is no evidence whatever that it is an important infection in Ghana at the moment. On the other hand there are several conditions, amongst which is bilharziasis, with a considerable prevalence and which should be controlled yet there are no mass means which satisfy the basic requirements of safety, efficacy and so on. Nevertheless there are several infections which could suitably be controlled by M.F.U. in the future. Against some of these effective vaccines are already available, e.g. tuberculosis, poliomyelitis, tetanus, whooping cough, typhoid and perhaps in the near future, measles. Mass treatment is also possible against hookworm and trachoma. Which conditions should next be dealt with will depend on the relative priorities which will be allocated not only amongst these diseases themselves but between the extension into this group and other types of medical service. Before a list of priorities can be drawn up an assessment of the economic and social importance of each disease has to be made. This will be determined in part by the prevalence of each condition in the different areas of the country, in part by its tendency to assume epidemic form, and in part by an exact knowledge of the effect of the disease on the average patient. It is surprising how little is sometimes known about this matter, for example there is still a good deal of uncertainty about the effects suffered by a person who has urinary bilharziasis. The consequences of several other diseases as yet uncontrolled are, however, better understood, for example ankylostomiasis.

There will be other changes besides extension of services; some modification of the systems of mass control will be necessary. Every programme of mass control can be divided into two phases. The first comprises the initial attack on the disease and such subsequent repetitions of the procedures as are necessary to reduce the prevalence to a relatively low but indefinable figure. To do this we employ mass measures, requiring for their success the co-operation of the whole population which is readily given at this stage, for everyone recognises the disease as being a danger to himself. In the normal course of events this interest is only maintained so long as the disease appears to be a threat to the public health and a point is eventually reached when the people feel that it no longer warrants the repeated and full co-operation of the entire community. It is at this juncture that we enter the second phase of control. Here we have to deal with a residual core of infection, some form of control must be continued if eradication is the aim and in any event if control is abandoned transmission would gradually return to its former level and the earlier efforts would have been largely wasted.

It is important to remember also that mass control procedures are costly. During the period of the first phase they are worth the expenditure involved for the threat of the various diseases is largely removed. In the second phase further reduction of the newly attained low prevalence to the point of eradication is slow, often it may seem impossible to achieve and then active control has to be maintained indefinitely. In these circumstances the continued use of the original procedures will appear to be extravagant and this will lead to some difficulties. What is required at this stage is a refinement of the techniques of control, although these will still be based on the original principles they should now be applied selectively. To do this requires a considerable knowledge of the epidemiology of each disease, its distribution,

the groups of people most liable to infection and the time when it is most prevalent, so that a maximum yield can be obtained from the judicious application of limited resources of control. This new approach has two advantages, firstly control by this way is more likely to secure the public support which it requires for its success, and secondly it reduces the cost of the maintenance of control. This, of course, is where a disease intelligence service comes into its own in providing some of the answers to the problems of finding the more subtle means required.

Further changes can be foreseen. It is very probable that except where they are required to deal with epidemics M.F.U. field teams will become smaller and eventually much of the work might be conducted from fixed centres; one or two members of the staff undertaking all M.F.U. techniques within a limited area. This would have obvious advantages, any community becomes weary of large teams bull-dosing their way through a district, and centre based staff would raise less difficulty in accommodation. Furthermore they would become recognised and accepted as a permanent part of the health service personnel of the area and this would help in retaining the interest of the public for, as we have seen, a major problem in the second phase of disease control is in getting the people to co-operate; unless they do so much of the efforts of M.F.U. may be wasted. There would, however, be a danger in M.F.U. operating in widely spread singles and couples in this way. The physical disbanding of the traditional teams would result in a loss of the very important corporate spirit of the organisation and in addition readily formed teams would not be immediately available to deal with epidemics. However it is unlikely that this question will arise for some years since the campaign against yaws, which must be carried out by itinerant teams, will be continued until 1966 or later.

Finally it is possible that the M.F.U. fixed centres can undertake the collection of vital statistics. This, of course, is a large subject and would have to be approached carefully; but it seems to be a function that might usefully be added to the repertoire of M.F.U.

Part I

General and administrative

A general statement on M.F.U. in 1961

The only part of the country still not covered by a medical unit is the area of the western and central Regions. It had been hoped that the new unit, which was first proposed about three years ago, would be in operation by the end of 1961, but this proved impossible for although the office, treatment centre and other buildings of the unit's headquarters at Tarkwa were completed by the middle of November work on the doctor's house was only then being started. As no other accommodation could be obtained the opening of this unit will have to be delayed until all buildings are finished, probably in the first half of 1962.

The Tsetse Control Unit ceased to exist as a separate entity this year. This change was made as the unit had been without an entomologist since May, 1960 and because it seemed that this post would not be filled until the end of 1963. The continued control of this unit from M.F.U. headquarters at Kintampo for such a long period is unwise and it is better that its two sections, which are based at Wa and Gambaga, should merge with the medical units there. This change, which was made in October, means that the North East and North West medical units now undertake the entomological as well as the medical aspects of sleeping sickness investigation and control. This step was probably inevitable in any event and was not taken earlier only because the Department of Tsetse Control was joined to M.F.U. as recently as 1957 and its complete integration within this organisation must be a gradual process.

There have been some changes in the snail control unit. This was re-established in 1960, its objective being to carry out investigations on the snail hosts of bilharzia in preparation for a control project. For a time it was in the charge of a W.H.O. senior officer until, in the middle of the year, the Ministry of Health appointed a biologist to fill the post which had been vacant for three years. At this stage it was planned that a pilot control project should be undertaken near Wa towards the end of the year, the two biologists sharing the responsibilities and W.H.O. providing a sanitary engineer and a part time epidemiologist as well as much equipment. In anticipation of these changes the unit was then moved from Kintampo to Wa, redesignated the Bilharziasis Control Unit and put under the control of the M.F.U. Medical Officer there. Its future, however, is not finally decided upon and until it is its relatively small staff will be most usefully employed in collecting basic information on disease and host distribution in its special area near Wa.

At the end of 1961 the units of M.F.U. were:-

Medical Units

North West based at Wa	Brong Ahafo based at Kintampo	covering the western and eastern halves of the Northern & Upper Regions
North East based at Gambaga	" " Kumasi	
Ashanti " "	Volta " "	conforming to the Administrative Regions.
South East " "	Koforidua	

Specialised Units

Simulium Control Unit based at Lawra
Bilharziasis Control Unit based at Wa.

MAP I.

THE DISTRIBUTION OF THE MEDICAL FIELD UNITS IN

GHANA.



UNIT HEADQUARTERS

FIXED TREATMENT CENTRE



KINTAMPO : HEADQUARTERS
BRONG AHAFO UNIT

KUMASI ... ASHANTI UNIT

HO ... VOLTA REGION UNIT

GAMBAGA ... NORTH EASTERN UNIT

WA ... NORTH WESTERN UNIT

BILHARZIASIS CONTROL UNIT

LAWRA ... SIMULIUM CONTROL UNIT

KOFORIDUA ... EASTERN REGION UNIT

TARKWA ... WESTERN REGION UNIT

Except for the Ashanti Unit there was a doctor in charge of each of the medical units throughout the year; for the time being professional responsibility for Ashanti is taken by the Brong Ahafo Unit Medical Officer, but it is expected that eventually the unit will have its own doctor. An entomologist was in charge of the Simulium Control Unit throughout the year.

The distribution of the units is shown in Map I and further information is given in Appendix 1.

M.F.U's work in the field in 1961 was basically similar to that of recent years. The principal task is still in carrying out a campaign against yaws; this began in the Northern and Upper Regions in 1956 and progressed later to the Volta Region, Brong Ahafo, Ashanti and the work began in the Eastern Region late in 1959. During such a campaign the first objective is to reduce the prevalence of the disease in a community to about 1% this is achieved by mass examination and re-examinations of the whole population, penicillin being administered according to standard schedules. Generally three or four such surveys are necessary in each community and it usually takes about 4 or 5 years for the area of the size of a Region to be dealt with in this way but programmes are, of course, being conducted by several units simultaneously.

After the mass attack on the disease has been completed we pass to the next stage (see phases 1 & 2 described on page 66), where there are two distinct objectives, the first to keep a close watch on the behaviour of yaws so that we are not caught and surprised by high incidence building up, and secondly to continue the efforts to reduce the prevalence further still. Because we may no longer deal with the whole of a population these surveillances and control programmes may have to be considered separately at this point; but this is somewhat technical and is more fully discussed on pages 63-65. In general the first phase of a yaws campaign, i.e. the early efforts using mass measures may be relatively simple

compared with Phase 2 which requires tenacity and the acceptance of apparently less rewarding work: moreover a great deal of information from earlier surveys must be sifted in efforts to discover some of the epidemiological characteristics of the disease in the different localities and so contribute to the efficiency of the new forms of control.

The stage which has been reached in the campaigns against yaws in each of the Regions of Ghana is shown on Map 4 facing page 65. By and large the results which the teams have achieved so far are really very satisfactory for in general Phase 1 of the attack gives about a 75-90% reduction of yaws in a region within a comparatively short space of time. In several districts the Long Term surveillance of Phase 2 has disclosed that the downward trend of the disease is being continued but in a few areas, mostly relatively small, it seems very difficult to reduce the prevalence of yaws below 0.5%. These localities are principally to be found in the more remote parts of the country and also in relation to some of the frontiers, so this continued prevalence is clearly associated with socio-economic factors. An incidence of 0.5% appears to be almost insignificant but when this is maintained in the face of continued efforts of control and has been associated with a high pre-campaign prevalence there may be little doubt that withdrawing attention from the area will be followed by an increase in yaws. This will be dangerous to neighbouring areas where infection has been better controlled for some time for then the proportion of the children who have escaped infection will be increasing every year and an epidemic of yaws might well occur in such an area.

In this campaign Unicef have provided the Land Rovers, penicillin and other equipment necessary, W.H.O. technical advice; M.F.U. continues to employ more than half of its staff in the work.

During 1961 a look-out was kept on all the main foci of trypanosomiasis. In 1957 an epidemic had been discovered in the north-east of the country but the area involved, compared with the last epidemic in the 1930s, was not large it covered some 2,000 square miles in the Gambaga district where about 1,000 cases were found. Within a year or two there was evidence that the disease was increasing in other parts of the north, fortunately the additional foci were all less than 100 square miles, the number of cases being counted in scores rather than in hundreds. The epidemic trend, however, has been clear enough. The picture gained from field investigations in 1961 is reassuring, the foci in the north-east were all re-examined and it is evident that the mass treatment, and more particularly the tsetse eradication programmes which have now been carried out in these areas, have brought the disease under control. In the north-west although the number of cases found in 1961 has continued to decline there is some indication of maintained activity of the disease in a few very small localities, and the experience in parts of north Brong Ahafo and Ashanti, the only other localities of the country outside the north where sleeping sickness is likely to become epidemic, has been comparable in some respects. The details are fully presented in Part 2 of the Report.

Tsetse eradication is expensive. Since 1957 this work has been concentrated in the epidemic foci of the north and by the end of 1961 most of this programme had been completed. At the moment it is not intended to go beyond these limited areas but rather to make sure that the clearings which have been made so far are efficiently maintained and to observe the effect that this has on the prevalence of the disease generally. This was the policy adopted four years ago and there has been no reason yet to alter it radically. In addition to the special examinations which are now made annually in all the potential foci of trypanosomiasis surveillance for the disease has been carried out in 1961 wherever the opportunity offered. It

is recognised that in an area of high endemicity mass survey and treatment of the cases discovered probably has little effect on controlling the disease, but these surveys are often undertaken with the objective of keeping a watch on its behaviour and, of course, the cases benefit by receiving immediate treatment.

The epidemic of cerebro-spinal meningitis was this year slightly greater than in 1960, there has been a general upward trend of the size of the annual dry season outbreak since 1955. It was predominantly in the North-west of the country, in the Wa and Lawra districts and M.F.U. again established field reception camps where over 1,000 cases were treated between January and April. At the beginning of the year it is impossible to predict what will happen during the next few months, whether an epidemic will occur or which area will be attacked and in the past an outbreak has sometimes been well established before M.F.U. were called in and could come into action. To overcome this dangerous delay it was agreed with the P.M.O. of the Northern & Upper Regions towards the end of 1960 that in 1961 M.F.U. would undertake to deal with the C.S.M. situation from 1st January and throughout the epidemic period in the whole of the Upper Region and in the Gambaga district of the Northern Region, this being the part of the country most liable to epidemics. This meant that the North East and North West medical units were responsible for the control and treatment of the disease outside hospitals from the outset and being fully aware of the situation could act on this intelligence as necessary. They undertook case finding as well as treatment, and also the collection of information, in particular the notification of all cases, this information was then fully relayed to the office of the P.M.O. and the M.O.H. in Tamale. The system was so successful in 1961 that it has been agreed that it should now be adopted annually. Those who felt that this new division of interest between the P.M.O.s health services in the north and M.F.U. would lead to difficulties were proved wrong, it led, in fact, to an even closer relationship between staff at all levels.

Limited mase prophylaxis has been used against C.S.M. in recent years, for example an attempt was made to protect certain village communities in 1960. This year the work was expanded a little and a population of 4,000 living in 7 neighbouring villages in the wa district was given sulphatriad on two separate occasions in February. The results show that the attack rate of the disease then fell, but those who are interested in the matter must refer to the detailed report on page 88.

In 1961 the role of M.F.U. in dealing with outbreaks of measles was finally systematised. In the areas of the North East and North West Unit, where the disease appears to be most serious, staff have now been trained to diagnose and treat complications of the infection by standard procedures and to record their findings and their work. At present only a small proportion of the outbreaks are being dealt with, a great number must still go unreported but it can be expected that in time the units will be called upon more frequently and at an earlier stage than at the moment. This will come about as it is recognised how much young life can be saved by seeking the immediate help of these teams and as the health services expand generally and communications are improved. Although there is no doubt that in some years many hundreds of children have died following measles it is still difficult to obtain exact information even about the most elementary aspects of the epidemiology. The measles teams, generally consisting of two members of the staff, deal with a village outbreak by inspecting every child immediately, treating those with complications of the disease, particularly broncho-pneumonia and enteritis, and re-examining all the other cases daily until their danger period is over and in finding all new cases as they occur and following them through in the same way. This work is still largely limited to the North East and North West and will be extended to other units as the need arises.

M.F.U. was not called in to deal with any other epidemic during 1961. No well defined outbreak of smallpox occurred, there was a continuing decline of cases as in previous years. The opportunity was taken to vaccinate populations wherever possible by the polyvalent teams of M.F.U. There was no further epidemic of anthrax, there had been two last year, and no cases of yellow fever were reported in the country.

Whilst the Ashanti and South-east Units have been wholly occupied with their yaws campaigns in 1961 the others have been able to continue a country wide survey for urinary bilharziasis which was begun in 1960. This has now been completed over the whole of the Upper, Northern and Volta Regions. The examinations are made in boys between 5 and 15 years, this simplifies the work and allows it to be carried out very quickly and the infection in this group can be regarded, for comparative purpose, as representative of the importance of the disease in any locality. The distribution and prevalence patterns and the stage which this operation has reached so far can be seen in Map 7 facing page 78.

A new trend in the work of M.F.U. in 1961 is seen in a system of stools surveys which has just begun. No large scale investigations have yet been made in Ghana into the distribution of the intestinal parasites and there is an enormous field to be covered. The purpose of these surveys is to provide certain basic information which is necessary in making a comprehensive review of the country's health programmes. It is, for example, desirable that the burden which is placed on the people of this country by hook-worm infection should be known with some degree of accuracy and in any event the determination of disease prevalence and distribution patterns is an essential preliminary of mass control. These

surveys will be made in children for the same reasons that this group is used in urinary bilharziasis investigations and the information collected will provide a means of comparing the prevalences in different areas as well as picking out in each district the various incidences from heavily infected foci to localities where the disease does not occur. Like all new work it must be carefully planned and requires that staff should be properly trained in their new tasks.

Looking farther ahead, and as a result of discussions with the T.B. Unit in Accra, two field assistants received training in tuberculin testing and B.C.G. vaccination in 1961. Should it be decided at a future date that some degree of mass vaccination against tuberculosis is desirable M.F.U. might be able to assist for it is already orientated to programmes of mass control in the field, and a knowledge of the special techniques would then be required. This training of a limited number of staff will probably be continued in 1962. One of the doctors of this organisation is also at present engaged in making a preliminary and limited review of venereal infections in a small area near his unit headquarters; the intention is to see if some adequate assessment of its importance can be made, and what service might be provided by M.F.U.

M.F.U. has a number of Fixed Treatment Centres in the different regions; at present most of them are in the north. Until the last few years their purpose was to provide a specialised service for patients coming for examination and treatment of sleeping sickness and yaws. But as these diseases have declined the centre staff, there may be either one or two persons at each post, have been increasingly employed in case finding surveys within a particular territory allocated to them. During 1960, and more especially this year, these centres have undertaken all M.F.U. duties within their own areas. Thus it will no longer be necessary for a large team to enter those parts of the country except they are required to deal with an epidemic which is beyond the capacity of the centre staff. Their duties therefore are to conduct surveillance and control of sleeping sickness and yaws, to deal with measles outbreaks,

conduct case finding of C.S.M. if necessary, maintain the vaccination status of the community and make surveys for endemic and epidemic conditions usually undertaken by larger teams, for example the stool surveys should be done from centres wherever possible. The programme of the work will vary from centre to centre, to be realistic it must be orientated to the particular problems of the area and this is where the proper assessment of previous investigations is so important. In the south surveillance for trypanosomiasis will rarely be necessary, whereas in parts of the north constant attention must be focussed on the disease. There is great scope for the expansion of this system of work in M.F.U., but it must be remembered that it has certain dangers, which have been discussed on page 13 and are principally that breaking up M.F.U. into very small units of one or two men will eventually destroy the corporate spirit of the organisation, in addition preformed teams could no longer be available to move to an epidemic at a moments notice or to conduct large scale surveys.

So far there has been little increase in the number of centres, there are 13 permanent bases at the moment. Most of those existing are housed in government or local authority buildings, but in some instances private rooms are rented. If extension of this service were required no new buildings would be necessary, the staff could operate from a variety of headquarters for example from the new health centres. During the year the fixed treatment centre of the Brong Ahafo unit at Kintampo moved into the health centre there; apart from providing a functioning model on which other M.F.U. centres can be patterned it has provided most useful experience in working with the health centre staff who, of course, have no direct connection with the Unit. The organisation and operation of centre surveys requires a considerable amount of work by the medical officer of the unit; in part, therefore, extension of this system will depend on having experienced doctors.

Whilst some progress has been made in 1961 in the development of the M.F.U. fixed centre service there is one aspect of our work which has an equally important bearing in our future stability, where advance has been almost impossible. That was in training. One medical officer undertook this work for a brief period in 1961 but left M.F.U. shortly afterwards and it has now been decided that since it is unlikely that a training officer would be available the headquarters professional staff, which was strengthened in the last quarter of the year, would probably have to divide this work among them.

As increasing attention was being given last year to the epidemiological aspects of M.F.U.'s work it became evident that there is a need for a more comprehensive disease intelligence service than that provided by the operations room at Kintampo. The diseases with which M.F.U. is immediately concerned in the field are still limited and some more all-embracing bureau would be very useful. In 1961 information about other important infections has been collected from reports, papers and other sources and is being compiled as an aid to understanding their behaviour in Ghana. Some of this data is now represented graphically, in maps, charts, diagrams and by photographs and displayed on screens in Kintampo. The demonstration is divided into two parts, an exhibition which is rather small and portrays the work of M.F.U. in broad outline only and can be moved. It had a successful debut at the Annual meeting of the Ghana Medical Association in Kumasi at Easter. The second part will be a much larger and more permanent demonstration which will represent the epidemiological and other aspects of the diseases with which M.F.U. is, or might be concerned. This has yet to be built up, it will be housed in the new teaching museum which was completed last year at headquarters. These simple collections might be useful in augmenting undergraduate and post graduate training in the epidemiology of some of the more important endemic and epidemic diseases of the country. Furthermore M.F.U. has

suffered in the past from the disability that its work, being mainly in the field, is not readily seen and understood by newly qualified doctors. It will be to the ultimate advantage of the organisation to interest our colleagues as much as possible in this work and its great potentialities.

It has been pointed out on a great number of occasions before that the role of M.F.U. must constantly evolve to meet new circumstances. As the process of change can only be gradual it is essential that every new challenge is anticipated well in advance otherwise we shall not be prepared for it. In the long established forms of work M.F.U. is well served by its trained technical staff, but the introduction of new systems and new techniques require the closest attention from the unit medical officer. But if he is in fact himself inexperienced in M.F.U. it will be some time before he can make his full contribution to the programmes. The tendency in the past for doctors to work in this organisation for only a short while, leaving when their experience made them really valuable members, has been unfortunate if inevitable. On the surface it might appear that circumstances were no better and no worse in 1961 in this respect than they had been in the last ten years. There are, however, one or two significant aspects of the very difficult matter of professional staffing which give grounds for hope of an improvement and are well worth pointing out. Firstly there are now more doctors available for M.F.U. than at any time previously; at the end of 1961 there were 8 on duty and two others who might fairly be regarded as belonging to the organisation, were taking long courses in Europe. Of the total of 10 doctors four are Ghanaians, some of whom will probably spend a considerable part of their working lives in field medicine, this is only the beginning. Once the professional staff of M.F.U. becomes established in this way and is then strengthened and finally becomes greatly experienced then indeed will the organisation be able to move rapidly forward, far outstripping the modest advances of today.

Staff

(a) Establishments

The only change made in the approved establishments at the beginning of the financial year on 1st July was in an increase from one to two Special Grade Medical Officers. The problem of 1961, as in previous years, was not in obtaining approval for posts but rather to find the men to fill them but even in this the situation was better at the end of December than it has ever been before. Continuity of appointment in the scientific grades has also been more satisfactory than in recent years and we can look forward to a considerable improvement in the future and it is certain that before long there will be an increasing competition to fill various posts. The technical subordinate staff remains stable for these officers are not liable to transfer from M.F.U. to other work and the cause of their leaving the service is generally to retire.

In 1961 the post of the Development Officer, M.F.U.s transport officer, was taken onto the establishment of the Government Transport Department and redesignated Assistant Road Transport Engineer. It was obviously in the interest of our Development Officer that he should be absorbed into a system which carries prospects of promotion. The Transport Department have undertaken to continue to provide one Assistant Road Transport Engineer for M.F.U.

There are still many vacancies in the clerical and stores grades of M.F.U., in particular more than half of the clerical officer posts are unfilled. The various divisions and units of M.F.U. managed to do their work in spite of these shortages but in these circumstances duties and responsibilities often have to be delegated to staff who have not been trained for them; this may not be without some risk.

A number of vacancies exist in the junior technical grades, the field assistants and field technicians. No staff have been recruited for several years because we have as many as we can competently supervise at present and the need at the moment is to train those already at post in new techniques rather than to take on additional persons.

(i) Senior staff

Dr. Wickremasinghe, Special Grade Medical Officer, left the service in the middle of the year, having worked in M.F.U. since 1956. This post was filled by Dr. Grant who was promoted to the appointment when he returned in September from taking the diplomas of Public Health and Tropical Medicine. Dr. Koney and Dr. Ali went on study leave towards the end of the year, to take D.P.H. courses. Three new medical officers were appointed, Drs. Ali, Foli and Ruland to the Ashanti & Brong Ahafo, South East and North East Units respectively.

Mr. Odei was appointed biologist in July; the W.H.O. senior officer, Dr. McCullough, also working in the Bilharziasis Control Unit went on leave in August and by the end of the year it was not known whether he would be returning. It was decided that Mr. Chinery, who had been expected to fill the second entomological post in mid 1961 after taking a diploma course, should remain in London to take a Ph.D. In September Mr. Sapong, Field Superintendent joined the year's course at the International Statistical Training Centre for West Africa at Achimota.

Mr. Farr, Tsetse Control Officer, retired from M.F.U. in October. He joined the medical department's tsetse control division in 1947 as a reclamation officer and ten years later when the Department of Tsetse Control was rejoined to M.F.U. he came to Kintampo and has been largely concerned with administration. Mr. Ameyaw, Field Superintendent also retired in 1961 when he was elected paramount chief of the Techiman State.

Mr. Quainoo, who began the year as the M.F.U. development officer was taken onto the staff of the Chief Transport Officer and restyled assistant road transport engineer; in August he was promoted to Road Transport Engineer and was transferred to the Department of Agriculture in Kumasi, his place as Assistant Road Transport Engineer being taken by Mr. Thompson. In the stores division the place of Mr. Quist-Therson as Assistant Stores Superintendent was taken by Mr. Buckman.

The senior staff posts of M.F.U. at the end of December were:

Specialist	1
Special Grade Medical Officers	2 (one vacancy)
Medical Officers	8 (two on courses)
Entomologists	2 (one on course)
Regional Field Supervisors	3
Tsetse Control Officer	1 (vacant)
Field Superintendents	7 (1 vacant)
Reclamation Officers	4

Grades seconded to M.F.U.

Senior Executive Officer	1 }
Assistant Accountant	1 }
Assistant Stores Supt.	1 }
Asst. Road Transport Engineer	1 from Transport Dept.

Details of senior staff distribution and duties are shown in Appendix 2 at the end of the Report.

(ii) Junior technical staff

During 1961 the last of the pupils in training passed out into the established grades.

The annual loss of field assistants and field technicians from M.F.U. is comparatively small, rarely more than 3 per cent. This year our numbers fell by only 6 and these are accounted for:-

- 1 Field Assistant Grade I on retirement
- 5 Field Technicians resigned.

The process of simplifying the junior technical grades which has been going on since the Department of Tsetse Control was merged with M.F.U. in 1957 was completed this year when the final obsolete rank, that of recorders, was abandoned and the staff regarded as field technicians, some to the established grade others to the non-pensionable post.

The age at which a civil servant can retire voluntarily was raised in 1961 from 45 to 50; normal retirement age was advanced from 55 to 60. This will probably have some effect in M.F.U. in future as it can be anticipated that many of the officers will naturally wish to continue in employment as long as possible and it will be increasingly difficult to find sufficient suitable posts for an ageing staff in an organisation which is essentially a mobile field service.

The junior technical staff position at the end of the year is given and compared with that of December, 1960.

<u>Pensionable posts</u>	<u>End of 1960</u>	<u>End of 1961</u>	<u>Establishment</u>
Field Assistant Grade I	22	24	24
Field Assistant Grade II	107	107	124
Field Technician	90	98	138

Non-pensionable posts

Field Technician(oldstyle)	8	11	13
Recorder	13	(regraded Field Technicians)	

Trainees

Pupil Field Assistants	<u>6</u>	<u>—</u>
	<u>246</u>	<u>240</u>

These distributions among the Units are given in Appendix 3.

Within these grades the following changes occurred in 1961:

Promotion of 3 Field Assistants Grade II to Grade I
Promotion of 3 Pupil Field Assistants to Field

Assistant Grade II

Promotion of 3 Pupil Field Assistants to Field
Technician Grade

Promotion of 9 Recorders to Field Technician grade

Promotion of 4 Recorders to Field Technician(oldstyle)

Loss of staff has been noted already.

(iii) Ancillary junior staff on M.F.U.
establishment

This group comprises the artisans in the transport division of M.F.U. In 1960 only one officer had been appointed, others joined during the year and it has now been possible to station one at both Gambaga and Wa, making a considerable difference in the maintenance of the vehicles for the units in the north.

The establishment is:-

Leading artisan	1 (vacant)
Artisan Grade I	
Artisan Grade 2	9 (2 vacancies)

(iv) Junior staff seconded from the
Ministry of Health

Clerical

The personnel division of the Ministry of Health have agreed upon an establishment of clerical and administrative grades suitable to the needs of M.F.U. This is:

Executive Officer	1 (vacant)
Junior Accounting Officer Grade II	1
Clerical Officers	15 (8 vacancies)
Clerical Assistants	9
Stenographers	2 (1 vacancy)
Typists	14

During 1961 the loss of staff was comparable with the experience of 1960. When the executive officer was promoted and posted from M.F.U. a succession of newly recruited executive officers, mostly school leavers had to be despatched to Kintampo, for each in turn left. Much credit is due to those who, because of unfilled establishments, undertook additional duties and responsibilities.

Stores

The death of Mr. A. Aguri, Storekeeper Grade II at Bolgatanga on 20th November, 1961 is recorded with deep regret. Mr. Aguri joined the former Tsetse Control Department in October, 1944 and was appointed a field assistant. Much of his service was spent in store work and when the stores division of the Ministry of Health was created in 1959 he transferred to it, but remained attached to this organisation.

The establishment of stores staff approved for M.F.U. is:-

Stores Officer	1
Storekeeper Grade I	2 (1 vacancy)
Storekeeper Grade II	7 (5 vacancies)
Stores Assistants	9 (1 vacancy)

The staffing position was less serious than in 1960; for the first time all the units have at least one officer for their store. And also for the first time technical officers of M.F.U. are no longer employed on stores duties, it has been possible to return those that remained to their normal work.

(v) Daily paid non-technical staff

The regular establishment of the non-technical and daily paid staff remains fairly constant from year to year; it can be summarised:-

Tradesmen, etc.	35
Drivers	43
Watchmen	26
Vector collectors	68
Field labourers (carriers)	
Labourers and miscella-	
neous	211

The "vector collector" group, paid at a higher rate than labourers, is made up of fly collectors - tsetse and simulium - and snail collectors and it is apparent that a single grade is required but this has not been recognised officially so far.

In addition to the establishment a large force of casual labour is employed to carry out anti-tsetse clearing of vegetation during the dry season, from December to March each year.

(b) Staff Health and Welfare

One member of the staff of M.F.U. retired on grounds of ill-health; there was only one case of any of the more serious communicable diseases, a driver who was found to have a trypanosomal infection, he was an early case and after a course of treatment returned to duty. A few cases of guinea worm infection occurred among those who were continuously on duty in the field; every year there are a number of cases of this infection in spite of the fact that filters are available for the use of the teams.

Annually a number of the staff are found to be infected with O. volvulus; the discovery usually being made when a routine skin snip examination is made or during the process of a general examination when an officer reports sick. Only on rare occasions, however, is there a recognisable disability from the infection.

Bearing in mind the nature of the work of M.F.U. where most of the staff are unable to establish a home except during the short periods of leave, most of their time being spent constantly on the move in the field, it is evident from the very small annual loss of staff that they are generally fairly well satisfied with their conditions of service.

The process of moving staff to their own regions has continued in 1961 and as far as the general medical units themselves are concerned the objective has been almost achieved. But it will be some time before the specialised units can be dealt with in the same way.

The work of the Epidemiological Division

This division has grown in every respect over the last few years and its work in 1961 justifies some particular commentary.

Its main concern has been to accept and compile field returns coming in from the separate Units. It also represents these findings graphically on maps and charts so that the progress and results of field operations can be seen at a glance, on screens, rather than having to extract the information from files whenever it is required. The next step will be to try to account for the different disease patterns which are found by comparing them with other known factors. For example to study the relationship between the distribution of a disease and different features of the climate. This requires that the representation of the geographical distribution of each disease must be prepared on maps of a standard scale. A particular feature of the work of this division in 1961 has been to initiate a mapping system to show the prevalence of a disease in each area of 5 minutes latitude by 5 minutes longitude, an area of about 36 square miles. For many years now it has been routine for each survey team to fill in the necessary details about their findings on the map of the area with which they are provided. It is not difficult to translate these records to a national grid map which can be drawn to a number of different scales. Examples of this method of representing the geographical distribution are seen in some Maps in this Report, showing S.haematobium infection, leprosy and onchocerciasis.

It is sometimes considered that M.F.U. would be greatly helped by having trained statisticians sent to join its staff; this is only true if the statisticians have already had considerable experience of our work in the field; the aim should be to train M.F.U. staff who show an aptitude for this work; (this began in 1961 when the field superintendent in charge of the division started a year's course in statistics at Achimota). The division will have to pay a great deal of attention to the proper planning of future M.F.U. investigations, to ensure that the information sought and recorded in the field conforms to particular statistical requirements and at the same time that they are practical, both from the point of view of the capabilities of the staff and within the limits imposed by field conditions. A medical head will ultimately be required to extract the greatest value possible from the band of staff now being formed.

Each of the separate medical units of M.F.U. has a Records branch, which will ultimately be built up into a local epidemiological division. But its progress is severely hampered by the constant change over of medical officers (there have been 16 different heads of the N.E. Unit since it was first formed 12 years ago in 1949). A newly appointed doctor who has first to run his unit (this becomes increasingly easy with time but at the beginning requires much attention) does not always immediately turn to developing an epidemiological outlook. Most do not show this until a year or more, when they are often about to leave M.F.U. The effect of the rapid change over of medical staff is seen most in the work on the epidemiological side of the separate units and also in their Reports.

Training

Some comment has already been made on this subject under the General Statement on M.F.U. in 1961. The training that is required is not for new staff but for those already in M.F.U. so that they can be prepared for new phases of the work. It is probable that this would have to be integrated with the training of other medical auxiliaries working in the field of rural health. In 1961 some discussions were held in Kintampo with the Principal Medical Officer of the Ashanti and Brong Ahafo Regions on the possibility of having such an integrated scheme in Kintampo; a decision is awaited from the Ministry of Health. There seems to be no reason why the M.F.U. field assistants should not have training which is comparable in standards with that given for example, to the forest rangers. The facilities are available in Kintampo: all that is lacking is a training medical officer who can devote his full time to this work. To divide it among a number of headquarters officers is a poor second alternative, for their other duties tend to come in the way and a systematic course thus becomes disorganised.

M.F.U. must play its full part in the future rural health programmes. This requires above all that a training scheme is planned for the work that lies ahead and is implemented in plenty of time to avoid hasty and unprepared expansion of the services.

Administration

The administrative arrangements of M.F.U. are briefly indicated in Appendix 1 at the end of the Report. In recent years the officers in charge of the divisions at M.F.U. headquarters in Kintampo have become sufficiently experienced to enable them to work largely on their own. However co-ordination of the divisions is required, for example in financial matters and more particularly in the preparation of the annual estimates for these require a comprehensive view of M.F.U. It is also necessary to ensure that the divisions and the units follow particular lines of policy in administrative matters, just as units must, for the time being, follow particular policies in technical matters.

Medical Officers newly posted to Units often feel that they should not be concerned with administration. It is a question of degree. They should certainly not execute much of this for it can be delegated; but they should be interested in all aspects of the working of their unit and should have a fair knowledge of its administration, and this is very readily acquired. Unless they have this willingness and a very simple aptitude their professional work is more difficult to carry out than it should be.

Buildings

The organisation is responsible for maintaining its own buildings, offices and quarters in both Gambaga and Lawra. This work is carried out by the tradesmen which came over to M.F.U. with the Tsetse Control Unit. These staff have also undertaken certain buildings for M.F.U., in previous years, the stores and transport yard in Kintampo, and in 1961 they completed the new training block, lecture room, library and museum. Later in the year they began a Minor Works programme at Gambaga, the construction of 5 water tanks and mosquito proofing of the M.F.U. quarters.

Transport

The Assistant Road Transport Engineer has a fleet of 50 vehicles of which about 15 have been provided by Unicef for the Yaws Campaign - these are all Land Rovers except for a 2 ton truck. The vehicles provided by the Ministry of Health are Bedford 3 ton trucks, $1\frac{1}{2}$ ton trucks and Land Rovers. During the year there were two accidents, in one the vehicle was completely burnt out.

The transport division is also responsible for the piped water supply and the electricity in Kintampo. Rationing of water had to be imposed for a few weeks in August due to a partial failure of the rains and it was apparent by the end of the year that this would be necessary, perhaps on a severe scale, in the forthcoming dry season.

Library and Publications

The M.F.U. library will shortly be rehoused in the new training building, the present room being given to the field superintendent of the Epidemiological division. It had been hoped that the Ministry would provide a clerical officer with a West African School Certificate who would join M.F.U. and later be trained in library work. Unfortunately it has not been possible to find a suitable candidate and we have continued to employ a field assistant in the Library.

During 1961 Mr. M.A. Odei's "Review of the distribution of Snail hosts of Bilharziasis in West Africa" was published in three parts in the Journal of Tropical Medicine and Hygiene 64, 2, 3 & 4.

Dr. Onori's "Results of a Mass Campaign against Yaws in the Volta Region of Ghana" was published as a W.H.O. document WHO/VDT/286.

Dr. Scott read a paper on "The Endemic Diseases" at Easter Meeting of Ghana Medical Association.

Visitors

Among overseas visitors to M.F.U. headquarters in Kintampo were Dr. P.Kapoor, Specialist Leprologist, Poona, India; Professor B.G. Macgrath, Dean of the Liverpool School of Tropical Medicine; Professor P.C.C. Garnham, London School of Tropical Medicine; Dr. A. Gunders, Liberian Institute of Tropical Medicine; the High Commissioner for Nigeria in Ghana; Professor I. Karockulor, U.S.S.R.; Dr. O.P. Causey, Rockefeller Foundation; Dr. D.B. McMullen and Mr. Z.J. Buzo, W.H.O. Bilharziasis Advisory Team; Dr. Newman, Harvard University, Dr. Christiansen, W.H.O. Consultant for yaws; General M.A. Vaucel, W.H.O. Consultant for trypanosomiasis; Sir Selwyn-Clarke; General Sir Alexander Drummond; Professor A. Herrnische, Munich University; Professor Harold Rogers, Belfast University.

Among visitors from within Ghana were Dr. F.T. Sai (D.C.M.O.); Dr. D. Brachott, Ministry of Health, Dr. Djoleto, P.M.O. Ashanti and Brong Ahafo; Dr. J. Gillman of the National Institute of Health, Accra; Dr. Saakwa-Mante and Mr. A. Evans-Chinery of the Ministry of Health.

MAP. 2.

SHOWING LOCALITIES IN WHICH SURVEYS AND MASS CAMPAIGNS WERE CONDUCTED EXCLUDING THE WHO/UNICEF/GHANA YAWS CAMPAIGN



REF. TO MAP.

POLYVALENT SURVEY BY MOBILE FIELD STAFF	[Grid of 16 squares]
SURVEYS DONE BY FIXED CENTRE STAFF	[Horizontal lines]
BILHARZIA (<i>S. HAEMATOBIA</i>) SURVEY	[Dashed lines]
ONCHOCERCIASIS (SKIN SNIP) SURVEY	[Dots]
MASS VACCINATION AGAINST SMALL-POX	[VVVV VVVV]

Brief summaries of the work of the individual units
in 1961

This section of the Report is intended to serve as a general guide to the work of the separate units during the year. For details of the investigations, their results and the conclusions drawn the reader must turn to Part II; four Maps will assist in following this section:-

Map 1 (facing page 16) shows the Regions and areas in which the individual units are based and operate, and marks the fixed treatment centres run by the organisation.

Map 2 (facing this page) shows the areas in which units worked other than in yaws control.

Map 3 (facing page 46) shows the areas in which sleeping sickness surveys were made, and some of their findings.

Map 4 (facing page 65) shows the work of the yaws campaign in 1961, with findings in both Phase 1 and Phase 2.

1. Medical Units

(a) North East Unit

This unit continues to have the most varied programme of work. Attention was given in the first place to sleeping sickness. Although the epidemic which began a few years ago in South-east Mamprussi seems to have been brought under control it is essential for the unit to be particularly vigilant. Surveillance, with treatment of cases, was carried out in all of the 7 recognised trypanosomiasis foci in the Unit's area in 1961. In addition surveys were made by the centre staff at Yendi and Kpandai into their own areas. In the control of yaws the Unit has passed from the first phase into the second; Long Term Surveillance was carried out in the greater part of Eastern and Western Dagomba and Eastern Gonja.

In the more northerly part of the North East yaws has not been the serious problem that it has been in Eastern Dagomba, thus more frequent attention is required in the latter district. Again staff at the Yendi and Kpandai centres contributed to this by a system of active case finding carried out from their bases. The special survey for S.haematobium infection which has been carried out in every community was completed by the end of the year. In addition vaccination against smallpox, the recording of certain endemic conditions was grafted into these surveys wherever possible. The unit also dealt with the annual dry season epidemic of cerebro-spinal meningitis in its own area, and with a considerable number of small outbreaks of measles. Towards the end of the year the unit absorbed the local division of the Tsetse Control Unit.

(b) North West Unit

The first duty of the unit is to carry out a limited surveillance for trypanosomiasis in the areas where the disease is most liable to occur. The three sleeping sickness foci of the North West were therefore investigated in 1961. The Long Term Surveillance for yaws, which had begun in late 1959 and twice interrupted by epidemics of cerebro-spinal meningitis, was completed this year. The area which had remained was the Jirapa survey area, and the whole of the Wa district. The work was also combined with a selective survey for trypanosomiasis and the recording of other endemic conditions and with vaccination. The S.haematobium investigations of the North West had been completed in 1960. Stool surveys, a new venture for M.F.U., were initiated in the North West, at Wa, after the necessary training of staff. The special non-routine task of the unit in 1961 was to make a trial of the expanded use of the M.F.U. fixed centres. The North West was particularly suited to this, for not only did the unit have the time for this new work but it has 5 established centres where the trials could be made. Unfortunately they ran into difficulties for the reason that it was initiated over ambitiously; the intention was to adapt

M.F.U. procedures only gradually for the work, but it soon took on the appearance of being an entirely new concept. The Unit also dealt with a moderate size epidemic of cerebro-spinal meningitis (nearly 1,000 cases) in the dry season; a trial of mass prophylaxis was carried out in a number of neighbouring villages. Some small outbreaks of measles were also dealt with during the year.

(c) Brong Ahafo

The Unit completed Phase 1, the mass control phase, of its Yaws Campaign which had begun in 1957. Final resurveys were made over most of the Region. Trypanosomiasis surveillance was carried out on the eastern side of the Region in the Yeji, Prang and Abeasi areas, this was the beginning of polyvalent work which will cover the whole of Brong Ahafo; it includes investigation into onchocercal, guinea worm and leprosy infections as well as mass vaccination against smallpox. The centres at Yeji and Kintampo performed this work in their own areas in 1961. The investigation into the distribution and prevalence of S.haematobium, which was begun on a very small scale in 1959 was continued this year as soon as staff became available at the end of the mass yaws campaign; this work was ^ain Banda/Sampa and Atebubu areas. For the first time for/number of years the Unit was employed in epidemic duties, when an epidemic of measles occurred near Kadelso, 50 miles north of Kintampo.

(d) Ashanti

The Ashanti Unit has been employed, almost exclusively with its Yaws Campaign. This was begun in 1959. This year the I.T.S. was completed, the teams operating for this purpose in the survey areas of the southern part of the Region. Resurveys were then begun, the staff moving back to the northern half. The fixed centre at Ejura undertook all M.F.U. work in the surrounding area which has been allocated to it.

(e) Volta Region

The Unit's major work was to carry out a polyvalent survey of the most northern part of the Region; to determine, in particular the prevalence and distribution of onchocercal infection, taking at the same time the opportunity to carry out mass vaccination against smallpox, and to determine the trypanosomiasis situation, in particular in relation to the Oti valley. At the conclusion of this work the team divided into smaller units which continued the onchocercal investigation along the eastern bank of the Volta. Apart from the yaws control exercised by the polyvalent team operating in the north of the Region surveillance was made in a considerable number of other survey areas. In some of these a team of two visited all communities for the examination, in others where the prevalence of yaws was lower only certain villages were selected; in the south, at Abor, the work of active case finding in the surrounding survey area was augmented by a temporary centre.

(f) Eastern Region

The South East Unit was engaged in completing the I.T.S. of its yaws campaign. The centre at the Unit headquarters at Koforidua carried out a resurvey in the locality. During 1961 the Medical Officer opened a clinic at the centre for cases of gonorrhoea. The purpose of this is to discover what we can of the prevalence of this disease and whether there is a need for special clinics. The number of cases treated at hospitals and recognised centres throughout the country is very small and may have little relationship to the incidence of infection; many cases may be treated by unqualified persons.

2. Special Units

(a) Tsetse Control Unit

The Unit was absorbed into the medical units at Wa and Gambaga in October. There has been no entomologist for this unit for over 18 months; a replacement was expected in August, but we were then suddenly advised that it might be two more years before he arrived. It was then essential to terminate the system of having field staff without a scientific officer in charge. The Unit's work during 1961 had been, in the dry season, to continue the tsetse clearing operations in the North East and North West of the country which have been in progress for sometime now and are within sight of being completed, and to maintain those clearings already made. In the wet season the unit has made quick surveys over much of the Upper and Northern Regions in an effort to bring up to date our tsetse distribution maps.

(b) Simulium Control Unit

This unit, which is based at Lawra, is trying out methods of control of the vector of onchocerciasis in an endeavour to discover some means which can be applied generally in the many areas of the country where the infection is not only prevalent but where it is of considerable economic importance. In 1961 the Unit restricted its activities to the extreme north-west

of Ghana to the Lawra district and the north-west part of Wa. Here intense surveys were made for all possible breeding sites in the numerous stream and river systems so that a concentrated effort can be made to treat these sufficiently with insecticide to control the fly within whole areas. In addition to this investigation control, by the use of insecticides, was continued along the Black Volta and Kamba rivers in the Lawra and Wa districts; this work has been carried out continuously for a number of years now.

(c) Bilharziasis Control Unit

Formed out of the Snail Control Unit and now at Wa. In the second half of the year the Unit has been engaged in preparing for a pilot project in a designated area to the south-west of Wa town. This has required the Biologist and his assistants to make detailed studies of the water courses for snail breeding sites and to become intimately acquainted with the area generally. A series of experiments have also been carried out to throw additional light on the problems of the snail host/environment relationships. The Unit has also been concerned in compiling the records submitted by the various medical units on the distribution and type of snail hosts found by the bilharziasis survey teams in the several parts of Ghana where they have been working.

Part II

Scientific and technical
Endemic diseases

1. Trypanosomiasis

Introduction

Our programme of investigation and control in the field of trypanosomiasis is determined by the past behaviour of the disease. Those who have kept in touch with the Annual Reports of M.F.U. will be aware of the principal events:

1930-1945 An epidemic of trypanosomiasis in Ghana commencing in two foci in the north; in south-east Mamprussi and in Lawra/Tumu, but subsequently spreading out to other parts of the country.

1945-1956 A period of relative quiescence of the disease.

1957-1960 Evidence that another epidemic cycle was beginning again in the main foci in the north, particularly in south-east Mamprussi.

Trypanosomiasis is a disease of the north, the reasons for this are fairly well understood. It is relatively uncommon south of latitude 7°N, and the major foci of infection are to be found north of latitude 9°30' N. It is characteristic of this disease that the geographical pattern varies little from year to year; that is to say once this basic pattern has been determined and the position of the foci, the areas in which the disease is rarely found and the intermediate zones are all defined, it is unlikely that this will change very much within the next few years. Certainly the intensity of infection, that is the prevalence, will vary between periods of low endemicity and epidemic conditions but the relationship between the prevalence in the different areas will remain the same. That part of the country recognised as a focus of infection will constantly show the greatest prevalence; those with the lightest prevalences at the time of the original survey will, in general continue to be least affected. The acceptance of this characteristic feature of the behaviour of sleeping sickness is important in determining our day to day control policy in M.F.U.

Attention is constantly directed to the recognised foci of the disease since this seems to be the simplest way to watch its behaviour, for it is in these places that new trends are first seen and are most readily detected. Furthermore, attacks directed against the relatively circumscribed foci give a better return, in terms of control achieved, for a particular expenditure of resources, than can be gained in other areas. Naturally no control organisation can afford to run on rigid lines and in M.F.U. we make sample investigations into those areas where trypanosomiasis is not expected to occur at significant prevalences. This is done to make sure that there is no need to change our views about the comparatively fixed disease pattern on which our policy of giving most attention to the recognised foci is based.

The only way to discover the prevalence of trypanosomiasis is to carry out a survey. The value of hospital records is limited because these institutions tend to be found well away from the endemic areas and in any event they attract only the late cases when diagnosis is sometimes difficult, the infection often being overlooked in the absence of peripheral trypanosomes. Records from the M.F.U. fixed centres, which were originally sleeping sickness clinics, give a better picture; these clinics are sited in the heart of the endemic areas, they are well-known to the public and the staff are particularly adept in diagnosing the condition. These **fixed** centres of M.F.U. have certainly been very useful in recent years in helping us to follow the trends of the behaviour of the disease. Each centre maintains a wall spot map where the location of cases attending voluntarily are recorded and this old and simple device has, on several occasions, led to attention being directed to a suspected rise of prevalence in village communities far earlier than would have occurred otherwise.

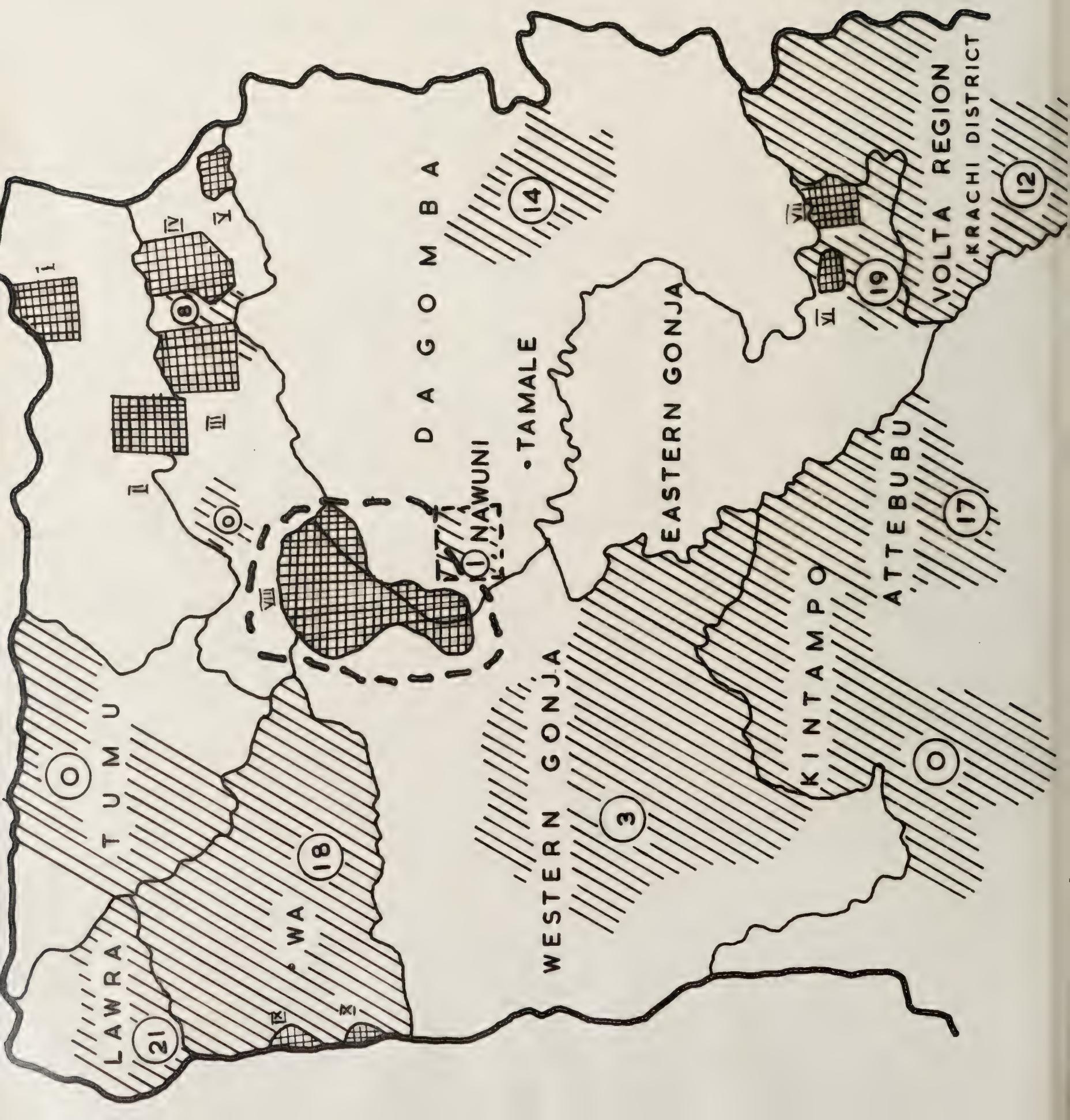
MAP. 3

SHOWING AREAS WHERE SURVEYS WERE MADE FOR TRYPANOSOMIASIS IN NORTHERN AND UPPER GHANA AND PARTS OF BONG AHAFO AND VOLTA REGION 1961.

FOCI ARE MARKED I - X

WORK IN THE FOCI IN 1961 AND CASES FOUND ARE DETAILED IN THE TEXT.

OTHER AREAS SURVEYED ARE SHOWN HATCHED // AND NUMBER OF CASES FOUND THEREIN ARE INDICATED IN CIRCLE E.G. 14



Control measures and investigations in 1961

(i) By mass survey and treatment

(a) In the recognised foci of the disease

In 1961 the policy of M.F.U. has been to give attention to each of the 10 "declared foci" of trypanosomiasis which lie in the Upper and Northern Regions. This has had a dual purpose, to attack the disease in its most important centres and to provide us with information on the current trends in its behaviour. In addition, the Units working in these regions, as well as the Volta and Brong Ahafo Region Units which have to keep an eye on trypanosomiasis in their northern areas, have carried out planned investigations and control in certain other districts. Where possible this work of surveillance and control is performed by the staff based at fixed centres in the local areas which have been allocated to them, but in most districts we still have to depend on the traditional system of using large mobile teams. The details of these investigations are given in Table 1, and few notes are necessary. See also Map 3.

In both Gogo/Sapeliga and Tongo we carried out sample surveys, selecting out those villages for examination which in the past have shown the greatest liability to infection. The prevalence in the foci has been falling steadily for sometime now and a full survey of the whole of each focus seems hardly justified. The sampling method was introduced to husband our resources. In Table 1 the "incidence on the previous survey" in both of these foci refers to the prevalence in the particular villages which were selected out for examination in 1961. The prevalence throughout these foci on the last survey were 0.31 percent and 0.11 percent respectively figures which are, of course, lower than the prevalences in the groups of sampled villages.

TABLE 1

Investigations in the 10 "declared foci" of sleeping sickness in the Northern and Upper Regions of Ghana in 1961.

<u>Focus</u> <u>No. Name</u>	<u>Persons examined</u>	<u>Cases Found</u>	<u>Incidence %</u>	<u>Incidence on Previous survey</u>
1. Gogo/Sapeliga	7338	11	0.15	0.5 {Sample Survey}
2. Tongo	6237	7	0.11	0.35
3. Samene *	3291	2	0.06	0.5
4. Sakogo	11305	15	0.13	1.12
5. Bumbuna	2596	34	1.31	1.61
6. Kayeso	2538	14	0.55	1.76
7. Kpandai	1604	0	0	0.15 {Sample Survey}
8. Mid-Volta Jan.'61	3180	15	0.47	- (part)
Oct-Nov.'61	5786	23	0.4	0.4 (completed)
9. Buga	894	0	0	0.29
10. Donye	1124	34	3.02	2.24
Total	45893	155	0.34	0.76

* Continuation of 1960 survey

See Map 3 where all the foci are indicated

The Sameme focus figures for 1961 refer only to a very small part of the area, completing a resurvey begun in late 1960. It is now M.F.U. policy to ensure that as far as possible each specific task is completed within the period of a calendar year which so simplifies its assessment in the Annual Report. Like the two previous foci Sameme is no longer a cause for anxiety; but continuous surveillance will be necessary for a very long time to come.

The Sakogo focus survey in 1961 has also given grounds for relief. The original survey in 1958 showed a prevalence of 1.55 percent the resurvey figure the next year was still high 1.12 percent. This inadequate result was due to incomplete tsetse clearing which was later rectified and a satisfactory reduction of the disease has now been achieved.

In the Bumbuna focus the findings in 1961 were somewhat unsatisfactory; the prevalence was still over one percent. There is however a simple explanation for this and again it refers to inadequate tsetse clearing. The Bumbuna focus which lies at the eastern end of south-east Mamprussi is a square with sides of about 7 miles. The population is less than 3,000. Several streams traverse the focus all carrying G.palpalis. In the dry season of 1960 when selective clearing against tsetse began in this focus it was known to be impossible to complete the work before the rains, consequently the decision was made to leave a stretch of a particular stream until 1961. Two villages lay in relation to this uncleared stretch

and a comparison of the findings in 1960 and 1961 shows how efficacious and essential tsetse clearing is:-

Survey findings in the Bumbuna focus

		<u>Population</u>	<u>Cases</u>	<u>Incidence</u>
1959	Initial survey and mass treatment	2,502	68	2.4
1960	1st resurvey	2,856	46	1.7
1960/1	Clearing in area except 2 miles of Nanumbugø stream			
1961	(late) 2nd resurvey			
	Population in 2 villages along uncleared stream	356	22	6.2
	Population in the rest of the focus	<u>2,193</u>	<u>7</u>	<u>.3</u>
	Summary of findings in 1961	2,549	29	1.2
		—	—	—

It is a repetition of the Sakogo focus experience where the whole of the area could not be cleared in one year. (The Bumbuna clearings were completed at the beginning of the dry season in December 1961 and it is confidently expected that this will have lowered the prevalence of the disease in these two villages when the next resurvey is carried out).

The situations in the Kayeso, Kpandai and Buga foci show satisfactory improvements, though the prevalence in Kayeso is still relatively high.

In Mid White Volta the original prevalence in 1959 was 2.57 percent. The incidence in 1961 is slightly lower than in 1960. The area is large and very lightly populated; G. palpalis is prevalent and only limited fly control is possible, for example at road-stream crossing points. More extensive clearing would be extremely costly. Perhaps in due course the focus could be dealt with by insecticides.

Finally we come to Donye focus. This is south-west of Wa and lies adjacent to the Black Volta; smaller than most of the other foci it has a population of about 1,000. The prevalences were:

1958	.84%	5 cases
1959	2.24%	18 "
1960		no survey
1961	3.02%	34 "

The behaviour of sleeping sickness in the Donye focus gives some support to the theory that the recent resurgence of the infection which began in the north-east of the country in 1956 would, like its predecessor in the 1930s, move over to the north west. The fact that it did not become seriously established in the west was due to the effective tsetse control which had been maintained there for some years. Donye lay just over the southern limit of the area where these tsetse clearings had been made.

These foci are represented in Map 3 by the numerals I - X.

The surveys in foci VI Kayeso, VII Kpandai, IX Buga were carried out by centre staff, the other foci were investigated by mobile teams sent into the areas specifically for the purpose.

TABLE 2

Sleeping sickness investigations into other parts
of the Upper and Northern Regions and in parts of
Volta and Brong Ahafo Regions in 1961

<u>District</u>	<u>Population examined</u>	<u>Cases found</u>	<u>Incidence %</u>
<u>North-East</u>			
1. Central Nalerigu	1598	8	0.5 +
2. Yendi	14726	14	0.1 +
3. "Rest of Alfai"	12537	19	0.15 +
4. Nawuni	1784	1	0.06
5. Kpasenkpe	2771	0	0
6. Area Around Gogo/ Sapeliga Focus	984	0	0
<u>North-west</u>			
1. Lawra West	9404	10	0.11 +
2. Tumu	6393	0	0
3. Western Gonja	8619	3	0.34
4. Jirapa	27420	11	0.04
5. Wa {excluding the 2 foci}	73800	18	.02
<u>Volta Region</u>			
1. Krachi District	36714	12	0.03
<u>Brong-Ahafo Region</u>			
1. Atebubu district	9352	17	0.18
2. Travellers crossing Yeji Ferry	7954	30	0.38
3. Kintampo area	4746	0	0 +
<u>Ashanti Region</u>			
1. Mampong district	8421	24	0.29
Total	227,223	167	0.07

See Map 3 where the areas examined are represented (except those of Ashanti) and the number of cases found is shown.

+ Surveys made from M.F.U. Fixed Centres.

(b) In areas beyond the recognised foci
of the disease.

Investigations in other areas, outside the declared foci, were made on a fairly large scale in the Northern and Upper Regions and also the more northernly districts of the Volta, Brong Ahafo and Ashanti Regions.

In general these were not ad hoc sleeping sickness investigations but were carried out as part of polyvalent surveys. The findings are presented in Table 2; and indicated on Map 3.

A few brief notes will assist in understanding certain aspects of our work and M.F.US approach.

Central Nalerigu was selected for examination because it lies between two foci - Sameme and Sakogo. It has not in the past been felt necessary to give it the same attention as those foci. When last examined in 1958, on the initial survey following the discovery of the epidemic in south Mamprussi, there were 14 cases, an incidence of 1.1 percent; in 1961 there were 8 cases, prevalence 0.5%.

The yendi area was surveyed partly because the centre staff there were available for this work and partly because we have been concerned in completing the picture of sleeping sickness in the Oti valley.

The Rest of Alfai and Nawuni surveys call for no comment.

Kpasenkpe was examined because 2 cases from this area had attended voluntarily for treatment at the Gambaga clinic, but no further cases were found in the community on this survey.

Lawra west, Tumu and West Gonja were surveyed as a duty of the fixed centre staff. In Lawra the cases were, as usual, found in relation to the Black Volta, but no marked grouping occurred.

In Jirapa only 11 cases in nearly 28,000 persons examined; but most of them were grouped in a relatively small part of the south-west corner of the district near Yagha. This might well be defined as a focus later, though it is of minor importance.

In Wa the cases were mainly related to the Black Volta just to the north of the Donye focus, in the northern part of the Wuchewau area.

In the Volta Region there were only 12 cases in 36,000 field examinations. Most of these cases were found in the north-east tip of the region which lies adjacent to the Alfai survey area controlled by the M.F.U. unit from Gambaga.

In the Atebubu district the cases were all centred around Prang. Yeji, which was heavily infected in previous years had no cases, this must be due to tsetse clearing and to the presence of the M.F.U. treatment centre on the Volta bank. A number of travellers arriving at yeji ferry are examined each year. In 1961, 30 cases were found in 8,000 people.

In the Kintampo district no cases were found in a survey of nearly 5,000 people. Contrast this with 79 cases in 4,300 in 1940.

In Ashanti, surveys were made by the staff from Ejura centre into the Adudwan and Sekodumasi survey areas of the Mampong district where the prevalence of trypanosomiasis has always been relatively high. The areas lie in the fringe of the forest and fly control by clearing is impossible. We must continue to depend for the time being on resurveys and treatment of the cases found. The areas of these investigations cannot be shown on Map 3.

TABLE 3

New cases of trypoons diagnosed and treated by Fixed Centres
in 1961 compared with the numbers in 1955 which
are shown in parenthesis

Unit	Persons examined				With trypanosomes				Deaths
	Bld.& Gland	Gland only	Bld. only	c.s.f.	Total	Clinical	Total	Treated	
North-East	201 (845)	42 (23)	23 (18)	24 (11)	14 (13)	103 (65)	16 (2)	119 (67)	4 (-)
North-West	561 (636)	17 (15)	4 (10)	6 (12)	— (1)	27 (38)	5 (19)	32 (57)	2 (-)
Volta Region	171	—	1	2	—	3	7	10	—
Ash/Brong Ahafo	342 (567)	14 (22)	12 (21)	10 (19)	10 (17)	46 (79)	74 (164)	120 (243)	2 (7)
Total	1275 (2046)	73 (60)	40 (49)	42 (42)	24 (31)	179 (182)	102 (185)	281 (367)	8 (7)

(ii) By treatment of cases attending voluntarily at centres

There is little reason to suppose that the treatment of cases of trypanosomiasis attending voluntarily at our fixed centres has any significant controlling effect. Cases generally come only when they have been infected for a long time and when they are often no longer a danger to the public health, being non-infective to tsetse. The value of the centres lies in their providing individual treatment for cases of the disease in areas where hospitals may not exist, in fact all the cases of trypanosomiasis found in Ghana in 1961 were diagnosed and treated exclusively by M.F.U. fixed centres and mobile teams. From the point of view of the organisation they provide us with a number of posts where information on the behaviour of sleeping sickness can be collected right in the centre of the endemic areas. Without these centres we should lack an important sense organ. It is in this light that the usefulness of these centres should be viewed. Certainly the cases attending for treatment are now very few and that is in accord with the decline of the infection throughout the country. The centres, which are marked on Map I are:

Upper Ghana	- Tumu, Lawra, Wa, Wuchaeu
Northern Ghana	- Gambaga, Yendi, Kpandai, Damongo
Brong Ahafo	- Yeji, Kintampo
Ashanti	- Ejura, Kumasi
Volta Region	- Kete-Krachi

At these 13 centres 281 cases were treated this year: in 1955 the number was 367, details are found in Table 3.

(iii) By chemoprophylaxis

Mass chemoprophylaxis against trypanosomiasis has not been undertaken by M.F.U. at any time.

This has been due to a great variety of reasons which need not be detailed here. Prophylaxis is, however given to certain small groups of people at particular risk:-

- (1) Ferrymen at Yeji and Buipe.
- (2) M.F.U. staff operating in foci where protection is deemed necessary: in particular, protection of tsetse clearing gangs.
- (3) To the staff and inmates of the Kpandai Leprosarium which is near a "declared focus".

The number of persons protected in 1961 was as follows:-

Brong Ahafo	78
North-East	52

(iv) By tsetse clearing

The tsetse control policy of M.F.U. can be stated quite simply. The first objective is to control, or better eradicate if possible, G. palpalis from the recognised foci of trypanosomiasis. This is attempted by selective clearing of the vegetation from the river and stream systems of the areas, using the method introduced by Morris in the 1940s.

The danger in a tsetse control programme is that the objectives will not be sufficiently limited, that tsetse control is attempted wherever flies are found rather than because it is established that their presence constitutes a real risk to the health of the people. By concentrating on the real foci of the disease the resources available can be used to their best effect, for it must be remembered that unless the clearings are maintained by annual slashing then the initial effort will ultimately be wasted.

In addition to clearing within the foci of trypanosomiasis we also clear some of the principal road-river crossings north of latitude 8° N., viz. Bamboi, Buipe, Yeji and Yapei ferries and Nawuni crossing.

When an entomologist joins the staff of M.F.U. for tsetse control work it will be possible to consider the use of insecticides, but until that time it will be necessary to continue using the traditional methods in which the subordinate staff have been so well grounded.

The M.F.U. programme of tsetse control has also taken into account the fact that the former Department of Tsetse Control undertook a considerable amount of clearing in the North West corner of the country, in the Wa and Lawra districts. In order to avoid waste of previous efforts it has been necessary to maintain this control and consolidate it by clearing a few streams of the area which had not previously been dealt with.

The work in 1961 was as follows (in clearing work 1961 must be regarded as the period December 1960 - May 1961).

(a) New clearings

5 streams in North West Lawra draining into the Black Volta

Nawuni crossing of the White Volta
Completing the clearing work in the Sakogo focus
work in the Bumbuna focus in progress.

(b) Slashing

As far as possible stream systems which have been cleared since 1957 mainly in south Mamprussi, north west Wa and Lawra and in foci beyond these limits, were reslashed in 1961. This work was effected along all the south Mamprussi streams; but the work lagged behind in the North West Unit.

In addition the ferries were given annual attention. Where re-slashing is carried out annually the work becomes lighter each year.

(c) Fly surveys

During the wet season staff were engaged in making fly surveys over much of the Northern and Upper Regions; the purpose of this being to obtain more up to date distribution maps of the riverine fly, particularly G. palpalis.

The work of the tsetse control unit continued to suffer from the lack of an entomologist, the last officer was not replaced when he retired early in 1960. The effect has been both in planning the work and in the assessment of the results achieved. To try to overcome this the two arms of the Tsetse Control Unit were amalgamated with the North East and North West medical units in Gambaga and Wa bringing the staff under the direction of the local M.F.U. doctors.

That the results of tsetse clearing have been fairly satisfactory is shown in the decline of sleeping sickness within the foci. Although mass treatment of cases is generally accepted as a potent measure of control it has been shown on an earlier page, where the findings of the Bumbuna focus were discussed, that under certain conditions this method without supporting fly eradication may have little effect. It is probable that the reduction of the incidence of sleeping sickness in the foci in south-east Mamprussi has been largely due to anti-tsetse measures.

Serial findings in these three foci from 1957 to 1961 have been:

	<u>Approximate population</u>	<u>Number of cases</u>			
		<u>Initial survey</u>	<u>First resurvey</u>	<u>Second resurvey</u>	<u>Third resurvey</u>
Sameme	10,000	293	89	48	21
Sakogo	10,000	166	125*	15	.
Bumbuna	3,000	68	46	29*	.
	23,000	527	260	92	21
		—	—	—	—

* tsetse clearing not completed at this stage.

This simple table is sufficient testimony to the effectiveness and the necessity of tsetse control.

Summary

The experience of 1961 shows that the prevalence of sleeping sickness in Ghana continues to decline; the number of cases found this year has been lower than at anytime since 1931, that is to say before the great outbreak of the 1930s and 1940s; and this in spite of the fact that we have made a search for the disease in all of the areas where it can be most expected to occur.

The total of 603 cases of sleeping sickness recorded in Ghana in 1961 is made up as follows:-

	<u>Population</u>	<u>Cases</u>	<u>%</u>	<u>% in the last survey in same areas</u>
Field surveys in "declared foci"	45,893	155	.34	.76
Field surveys in other parts of the country	<u>227,223</u>	<u>167</u>	<u>.07</u>	-
Total	<u>273,116</u>	<u>322</u>	<u>.1</u>	
	<u>_____</u>	<u>_____</u>	<u>_____</u>	
Cases attending M.F.U. clinics voluntarily for treatment		281*		
Grand total of cases		603		

*Of the 281 voluntary cases 179 had trypanosomes either peripherally or in the C.S.F.; the remaining 102 cases were diagnosed on clinical findings together with altered C.S.F. cell and protein content. All field cases are diagnosed only on discovery of the trypanosome.

In the past it has been customary to show the trends of trypanosomiasis in a graph. This year this is being replaced by an abbreviated table:-

<u>Year</u>	<u>Cases of sleeping sickness in Ghana</u>
1930	224
1935	3,885
1940	6,165
1945	5,059
1950	2,586
1955	710
1956	778
1957	893
1958	830
1959	928
1960	699
1961	603

The role of M.F.U. is not only to control the disease but to observe its behaviour, to recognise early changes and understand their significance so that we can be as prepared as well as possible against the inevitable return of the epidemic cycles. Both our disease intelligence and disease control services must be applied selectively; as the organisation becomes increasingly experienced in dealing with trypanosomiasis so it should become possible to refine further the methods employed.

Follow up of a series of cases treated in 1958

All cases of trypanosomiasis diagnosed by M.F.U. are lumbar punctured to determine their stage of infection, the findings indicate the course of treatment that they will receive. Early cases, those with less than 30 cells per c.mm. in the C.S.F. and 22 mg. percent, or less of protein, receive 8 daily injections of pentamidine. Late cases are given up to 12 weekly injections of tryparsamide. After treatment is completed the patients are asked to return for further re-examinations at increasing intervals, but few do so consequently it is difficult to obtain data on the results of treatment unless old cases are actively followed up. The search for a sufficiently large number takes up much time and is expensive owing both to the generally low prevalence of the disease and its distribution in the more remote parts of the country. An epidemic such as was discovered in 1957-1959 in south-east Mamprussi offers a rare opportunity to follow up a large number of old cases and assess the results of treatment. Cases diagnosed and treated in the villages in the near neighbourhood of Gambaga in early 1958 have been used for this investigation. There were 141 in the early stage, treated with pentamidine, and 119 in the late stage who receive a course of tryparsamide.

These two groups were first re-examined 18 months after receiving treatment in February, 1958, i.e. the first follow up was in August, 1959. The results were reviewed on pages 45-50 of the 1959 Annual Report of M.F.U.

A second follow up was carried out in August 1961 and the results are presented here.

In order to obtain a finer guaging of the progress of the patients the assessment at follow up is based on the three stages of the disease defined by W.A.I.T.R. viz:-

C.S.F. findings { Stage 1 less than 4 cells per c.mm. and 26 mg. protein percent
{ Stage 2 less than 40 cells and 40 mg. protein percent
{ Stage 3 either reading raised to 40 or above.

(i) Pentamidine treated cases

Of the 141 original cases in the selected group of villages 103, or 73 percent were seen and re-examined in August 1961 (three and a half years after being treated).

Of the 38 not seen 4 had certainly died. The remaining 34 were said to have left the area, some temporarily but others for good, but of this number 20 had been re-examined at the 1959 follow up and at that time none of them required further treatment, (i.e. they were still in M.F.U. stage 1).

Only one of the 4 deaths had occurred since 1959; a boy aged 6. On examination in 1959 he was weak and unwell and although his C.S.F. showed only 2 cells and 18 mg % protein (M.F.U. and W.A.I.T.R. stages 1) his condition and subsequent death must be attributed to trypanosomiasis. It will be remembered that the other three deaths were a girl aged 14, three weeks after treatment, and two young children who might have died from the sequelae of measles.

Of the 34 who were absent there was very reliable information that 2 were quite well; 8 others were vouched for by friends to be well but the report was less recent. Of the remaining 24 there was insufficient information except that they had actually left the area; i.e. they had not died locally.

On the face of it therefore it would appear that of the 107 patients who had not migrated there had been only 4 deaths in the $3\frac{1}{2}$ years after treatment.

The table below represents the results in 1961 in these 103 survivors:-

<u>Pre-treatment</u>		<u>Post-treatment</u>		
<u>W.A.I.T.R.</u>	<u>No. of patients</u>	<u>W.A.I.T.R.</u>	<u>Stage</u>	<u>No. lumbar puncture</u>
<u>Stage</u>		1	2	3
1	23	16	4	1
2	76	55	10	2
3	-	.	.	.
No lumbar puncture	4	3	1	.
	<hr/>	<hr/>	<hr/>	<hr/>
	103	74	15	3
				11

The four cases initially in stage 1 who had passed to stage 2 between 1958-1961 had all made improvement since the examination in 1959. One in particular had passed into the 3rd stage by the time of the first follow up, with 410 cells per c.mm., trypanosomes present in the C.S.F. and in a poor clinical condition but he had after further treatment in 1959, recovered to a C.S.F. count of 20/26.

The two cases initially in stage 2 who had passed to stage 3 by 1961 had both deteriorated and in addition to the worsening C.S.F. findings they showed clinical signs of cerebral involvement.

In summary it can be said that in these 103 patients (who might be taken as representative of the whole group for apart from the 4 deaths the others had left the area and there is no reason to believe that they had migrated because of ill health, rather the contrary), 74 seem to have been cured, 10 others appear on laboratory findings to be holding their own though clinically one of them was not so well, and seven cases had fallen back into a more advanced stage of the disease.

(ii) Tryparsamide treated cases

Of the 119 original cases 75 or 63 percent were seen and re-examined in 1961.

Of the 44 not seen six had died. Before the follow up of 1959 there had been two deaths, one under treatment and one woman died in labour. Between the two re-examinations at least another four cases had died; there are no details about them but from the records of the resurvey in 1959 it would appear that three deaths might have been due to trypanosomiasis.

Of the 38 "missing cases" nearly all were reported by acquaintances in the villages to have left the area for one reason or another.

There was no recent reliable report of any of them, though there was news of 11, that they had been seen and were well some little time ago. If it might be assumed

that the reason why the migrants left the area was quite unconnected with their health it would appear that the mortality rate in the late cases treated with tryparsamide was, after three and a half years about 7 percent (six deaths, but not all due to sleeping sickness, in 81 cases).

The table represents the results of treatment in the 75 cases who were followed up in 1961:-

Pre-treatment		post-treatment		
W.A.I.T.R. Stage	No. of patients	W.A.I.T.R.	Stage.	No L.P.done
		1	2	3
1	2	2	.	.
2	51	39	4	1
3	22	13	7	.
NO L.P.	.			
	75	54	11	1
				9

We must omit the 2 cases in stage one who had some amount of tryparsamide and are included here. Of the 64 others who had a lumbar puncture all had improved except one who had passed from stage 2 to 3, but was only just within its limits, C.S.F. 10/40. He had however clinical signs of trypanosomiasis.

Of the 11 remaining in stage 2 all were clinically quite well and several with low cell counts of 1, or 2 but had to be placed in the 2nd stage on account of a protein estimation of over 26 but less than 40 mg %. The high number of persons who were not lumbar punctured (9) was due to two causes, pregnant women are not subjected to this unless there are signs of disease, a lumbar puncture is then necessary. Contamination of the fluid with blood during the puncture is the second cause of no C.S.F. findings. All these nine persons were clinically normal.

On the figures available it might be too much to assert that there is a cure rate of 75 percent (54 cases in 73 of whom 6 died). It is indeed probable that the rate is better for to this figure must be added those who are clinically well yet retain an apparently abnormal C.S.F.

2. yaws

Introduction

It is essential to give an outline of the general principles of our anti-yaws campaign before describing the work carried out and the results obtained in 1961.

In 1956 the Ghana Government undertook to conduct a country-wide campaign against yaws with material assistance from Unicef and technical advice from W.H.O. Similar campaigns were being mounted by other Governments in Africa at that time.

In Ghana it was decided to cover the country Region by Region, the work was started:

North East	1956
North West	1956
Volta Region	1957
Brong Ahafo	1957
Ashanti	1959
Eastern Region	1959

The campaign in the western and central Regions has been held up by the delay in completing the headquarters buildings of the new Unit for those regions which are being provided at Tarkwa.

A campaign against yaws, in common with an attack on any endemic disease, falls naturally into two Phases.

Phase 1 of the attack is the period in which the prevalence of the infection is reduced to a relatively low, but often indefinable, level. In the case of yaws W.H.O. consider that Phase 1 might end when the incidence of infectious yaws is 0.5% or less and that of total yaws 2 percent or under. In M.F.U. we consider it prudent to accept lower figures, 0.2 percent and one percent respectively. In Phase 1 mass measures of control are employed; although these are expensive they can be justified since the disease is prevalent. Public support which is essential for the success of mass control measures is most readily given at this time, the people are well aware of the infection and the disabilities which it may cause.

Phase 2 is entered when two conditions are fulfilled. Firstly when the prevalence of the disease has been reduced to such a degree that its impact on the public no longer excites their enthusiasm for voluntary co-operation in mass control programmes. Secondly when the medical authorities feel that the original mass control procedures which are costly can no longer be justified as the means of dealing with the infection. Phase 2 is often called the consolidation phase. It is no less important than the first stage but it often tends to be neglected for whilst phase 1 is carried out in accord with a definite policy, is relatively short in duration, a year or two being sufficient to deal with a Region, and gives dramatic results, phase 2 work is far more difficult to plan competently requires a much greater knowledge of the natural history of the disease to tackle, may have to be continued for many years and is shorn of the drama of rapidly tumbling disease incidences. yet if the work of phase 1 is not to be wasted there must be a properly planned successor otherwise the infection will once more become prevalent. Only when the social and economic conditions of the community are improved will it no longer be necessary for some form of active control to be carried out, and this cannot be achieved overnight. The object of phase 2 is, of course, at best to try to reduce the remaining prevalence of the disease to the point of eradication or at worst to ensure that it does not rise above its original Phase 2 level. This stage is also concerned with the continued collection of information on the behaviour of the disease so it must be planned in such a way that the data can be fully used. If a disease intelligence system for yaws or trypanosomiasis or any other condition is desirable then it is essential that it should demand high quality information obtained in a well planned manner.

Phase 1 of a yaws campaign is carried out in Ghana, as in other countries, by mass examination and treatment of whole populations. At the time of the first survey, the I.T.S., everyone is examined and receives an injection of penicillin the dose depending on whether or not he has obvious yaws lesions. Subsequently resurveys (R.S.) are made at varying intervals from 6 months to a year when the whole population is again examined but on these occasions penicillin is only administered selectively. In general it requires an I.T.S. and up to three resurveys to reduce the prevalence of the infection to the Phase 2 level. More resurveys were required in the north than have been necessary for the south.

Regions are divided into Districts and Districts into M.F.U. survey areas. Thus in every survey area, District and Region there is consolidated information regarding yaws on

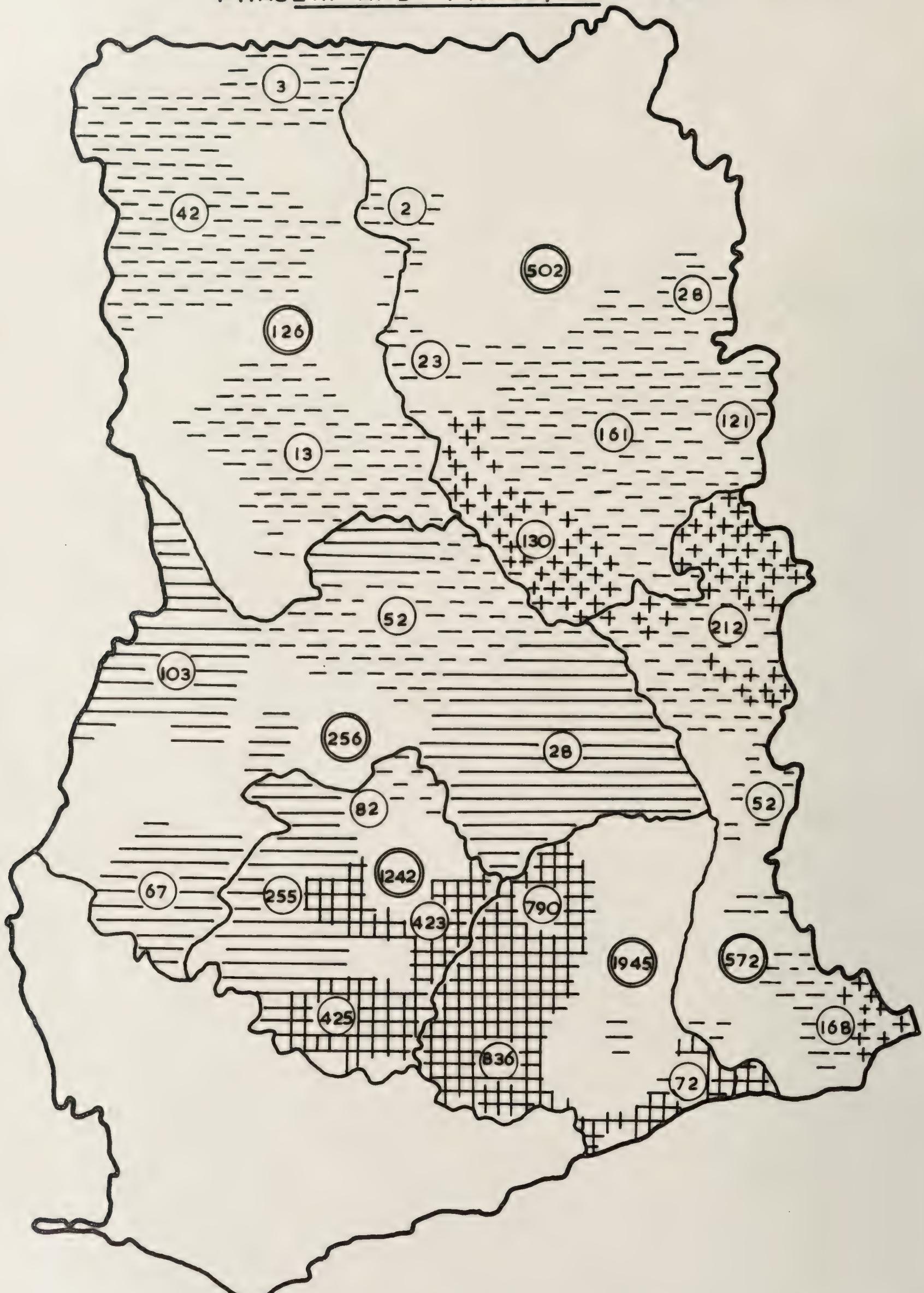
- (i) the Initial Treatment survey
- (ii) the final resurvey of Phase 1

In some areas the final resurvey may have been the first resurvey, in other more difficult localities it may be the fourth or even fifth resurvey. The information from intervening resurveys is not of much consequence, what we are trying to do is to compare the findings at the beginning and at the end of Phase 1 of each Region and its various divisions.

In M.F.U. we term Phase 2 the "Long Term Surveillance" (L.T.S.). In many countries this stage is not carried out by the organisation which performed Phase 1 but is in the hands of others e.g. local authorities. There are, however, many advantages in leaving the L.T.S. to the mobile organisations at least until the disease is reduced to a level where it positively cannot revive or until the general conditions of the people preclude yaws infection; an active L.T.S. can then be co-ordinated for whole regions and the experience of the natural history of the behaviour of the disease gained in Phase 1 can be put to its fullest use. Furthermore there are, in West Africa, many areas where there is no "Second service" which could provide an L.T.S.

MAP 4.

SHOWING THE WORK OF THE YAWS CAMPAIGN
PHASE. I. AND PHASE. 2. IN 1961.



INITIAL TREATMENT SURVEY ONLY	[Dashed horizontal line]
RESURVEYS ONLY	[Solid horizontal line]
LONG TERM SURVEILLANCE	[Dashed vertical line]
AREAS SURVEYED TWICE	[Grid pattern]
Nº OF INFECTIOUS YAWS CASES FOUND BY SURVEY TEAMS WITHIN SEPARATE LOCALITIES	168
TOTAL Nº OF INFECTIOUS YAWS CASES TREATED IN EACH REGION, SURVEY TEAMS AND TREATMENT CENTRES	572

The L.T.S. has two objectives firstly to exercise continued control, secondly to keep a check on the behaviour of the disease. The early part of the L.T.S. in effect differs not very much from Phase 1; it is concerned with trying to deal with those areas which are just below the required percentage. It is characteristic of the disease that whilst an I.T.S. and one or two R.S. may bring the prevalence of yaws in some areas to a negligible figure, i.e. the result is achieved rapidly, in others it requires a long series of R.S. to bring it just within the required standards of Phase 2 and one knows intuitively that if surveillance is relaxed in such places i.e. if Phase 2 is regarded as a passive rather than an active operation, the prevalence will soon increase. Phase 2 can, therefore, be sub-divided into 2 stages:

- (1) Planned more from the point of view of control than collection of data
- (2) Planned principally to keeping a check on the behaviour of disease.

Some areas move directly into stage 2 of the division; others, the "black spots", remain for sometime in the 1st stage.

Some people argue that an L.T.S. stage 1 really belongs to Phase 1 of the attack. If that is so then no arbitrary figures can be given for the prevalences which mark the entry into Phase 2. For a prevalence of one percent yaws achieved after an I.T.S. alone is a very different matter to the same prevalence obtained only after 5, 6 or 7 attacks, in the area of the latter to ignore further active control is dangerous.

In the survey areas where yaws was initially a serious matter the M.F.U. L.T.S. in the initial stages comprises a somewhat modified case finding survey; every village is visited but attention is concentrated on seeing the children and absentees have to be ignored. In those areas where yaws was originally less prevalent and where the effect of the I.T.S. and one or two R.S. has been very satisfactory, that

MAP 5. INCIDENCE OF INFECTIOUS YAWS IN
EASTERN REGION OF GHANA AT THE TIME
OF THE I.T.S. 1959 — 1961.
(INCIDENCE IS SHOWN FOR EACH SQUARE
(5 MINS. LONGITUDE BY 5 MINS. LATITUDE)



TABLE 4

Phase 1 of the Yaws Campaign

(a) <u>I.T.S. work</u> <u>persons examined</u>	<u>Yaws Cases</u>			<u>Incidence</u>	
	<u>Infectious</u>	<u>Total</u>		<u>Infectious</u>	<u>Total</u>
S.E. Unit	384,071	1,664	12,997	.43	3.38
Ashanti Unit	196,140	904	3,642	.46	1.86
Total	580,211	2,568	16,639	.44	2.87
(b) <u>1st R.S.</u>					
S.E. Unit	39,086	23	94	.06	.25
(c) <u>Final R.S.</u>					
Brong Ahafo Unit	209,824	218	1,652	.10	.79
Ashanti Unit	230,118	279	1,795	.12	.78
Total	439,942	497	3,447	.11	.78
Grand Total	1,059,239	3,088	20,180	0.29	1.90

is in those areas where conditions for transmission of the disease are clearly less favourable, then we carry out sample surveys. In these a number of villages are selected, those which showed the greatest tendency to yaws on the I.T.S. and R.S. being chosen. These new findings are compared with those in the same villages at the earlier investigations.

After this rather prolonged introduction to the yaws work of M.F.U. it should be possible to follow an account of the work carried out in 1961.

Phase 1 activities in 1961

Phase 1 was in progress in the Ashanti and Eastern Regions during the whole of 1961 and in Brong Ahafo during the greater part of the year.

The records of the work and the findings are summarised in Table 4.

It should be noted that in Ashanti the I.T.S. has been followed by a R.S. which is called the final R.S. since the prevalence of infection in these first re-examinations were sufficiently low to allow us to consider that after this step the campaign would enter the second phase (L.T.S.)

The areas covered are represented on Map 4.

The Unit in the Eastern Region almost completed the I.T.S., which was begun in 1959. Map 5 shows the prevalence of infectious yaws in the Region.

Maps 4 and 5 and Table 4 represent only one facet of the campaign, the ground covered and the number of examinations made and cases treated. They cannot give any indication of so many features and more particularly the difficulties, inseparable from work with rapidly

GRAPH 2.

WEEKLY NOTIFICATIONS OF C.S.M. CASES DURING THE "EPIDEMIC PERIOD" IN THE "EPIDEMIC AREA" OF NORTHERN & UPPER GHANA 1961. EASTERN & WESTERN HALVES OF THE COUNTRY RECORDED SEPARATELY.

NUMBER OF CASES

200

180

160

140

120

100

80

60

40

20

0

6 13 20 27 3 10 17 24 3 10 17 24 31 7 14

JAN

FEB

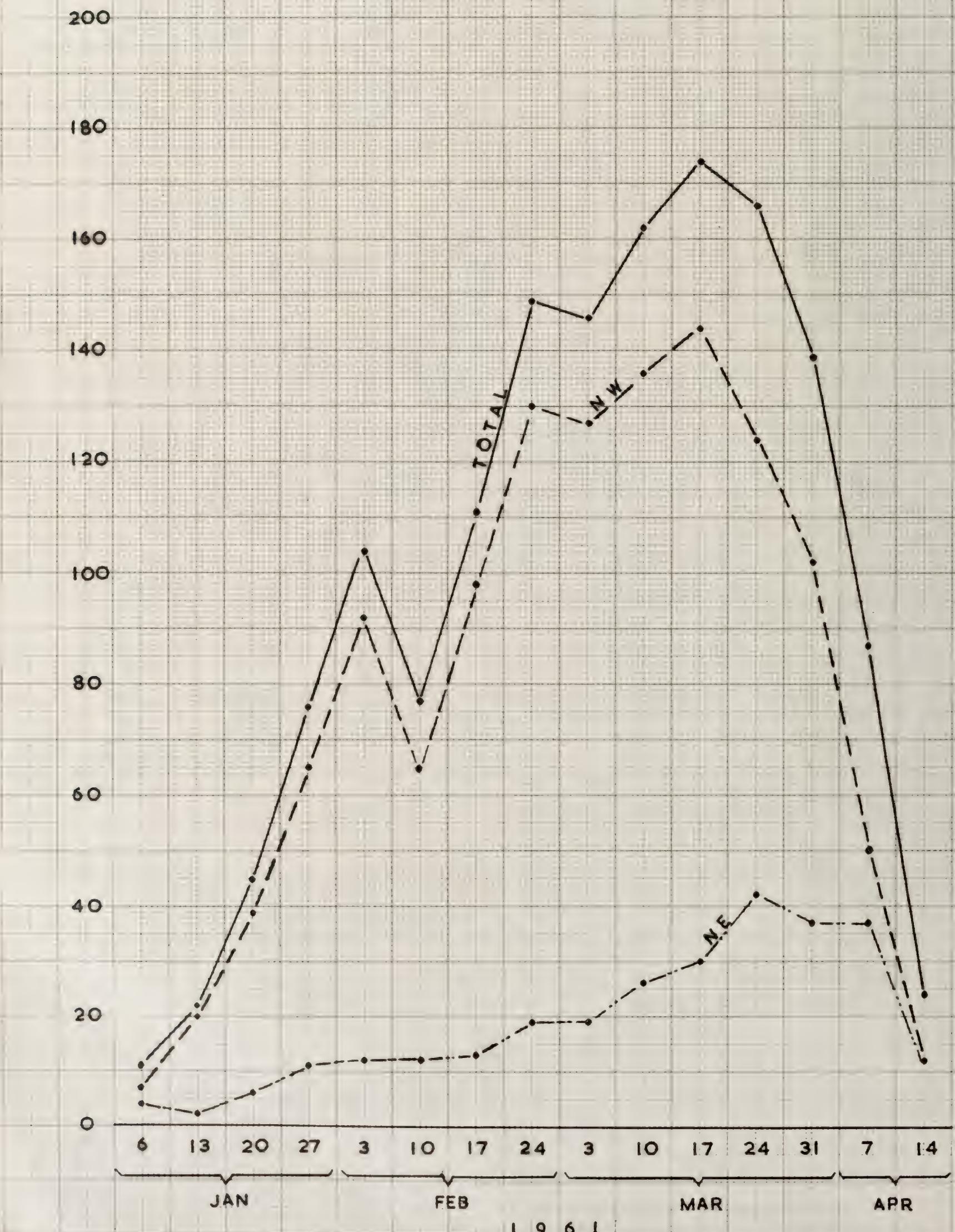
MAR

APR

1961

TOTAL

N.E.



moving yaws teams. There were areas where public co-operation was inadequate, for example in the coastal area of the Ada district (where, incidentally, yaws prevalence is very light); cocoa farming localities with widely scattered cottages, where considerable distances could only be covered on foot. M.F.U. is an outdoor organisation so the weather is important, sometimes there is too much water about, on occasions it has to be brought to the teams over considerable distances. There are, of course, compensations in this type of work in particular the welcome and co-operation which the teams, receive on nearly every hand, for public indifference or resistance is certainly rare. Considerable credit is due to the staff who, year after year, continue in field work, moving their sleeping quarters once or twice a week, this process being maintained indefinitely except during the period of their leave.

In the Ashanti Unit the experiment was tried of working two daily shifts, early morning and late afternoon. In areas where communities are small this allows more people to be seen than in the single long morning session.

In 1961, as in the previous years reactions to P.A.M. injection were noted in the Eastern Region during the course of the I.T.S. Seven persons (6 adults) developed urticaria of varying intensity 15 minutes to 2 days after the injection. A number of injection abscesses were noticed at the out-patient department of one hospital some weeks after the I.T.S. teams had worked in the locality.

The graph shows the reduction of cases of yaws in the Koforidua area as measured by attendances at the M.F.U. centre there.

TABLE 5.

The L.T.S.yaws work of the North East, North West,
Volta Region and Ashanti/Brong Ahafo Units
of M.F.U. in 1961:

<u>Region</u>	<u>Area</u>	<u>Population examined</u>	<u>Yaws Inf.</u>	<u>cases Total</u>	<u>% Inf.</u>	<u>Yaws Total</u>
<u>North-East</u>	West & East Dagomba (1) East Gonja	73,665	113	360	.15	.49
	(2) East Dagomba East Gonja	92,232	168	463	.18	.5
	Total	165,897	281	823	0.17	.5
<u>North-West</u>	Lawra	36,824	6	164	.02	.45
	Wa	75,818	36	138	.05	.18
	Tumu	6,393	3	7	0.5	.11
	West Gonja	8,619	8	8	0.09	0.09
	Total	127,654	53	317	0.04	0.25
<u>Volta Region</u>	Krachi	58,068	174	563	.3	.97
	Jasikan	60,903	38	272	.06	.45
	Keta	166,659	150	478	.09	.29
	Sogakope	13,086	14	31	.11	.24
	Total	298,716	376	1,344	0.13	0.45
<u>Brong Ahafo Region</u>	Kintampo	8,757	6	28	.07	.32
	Mo Western	3,948	0	3	0	.08
	Yeji/Prang	10,962	19	23	.17	.21
	Abease	2,794	1	1	.04	.04
	Total	26,461	26	55	.10	.21
<u>Ashanti</u>	Ejura	3,598	2	23	.06	.64
	Grand Total	622,326	738	2,562	.12	.4

Phase 2 (L.T.S.) work in 1961

For convenience it is desirable to consider the Northern, Upper and Volta Regions together (N.E., N.W. and V.R. M.F. Units) for Phase 1 had been completed in each of these for sometime before 1961 began. They are therefore in the L.T.S. stage. Each of these units had a programme of yaws surveillance for 1961, principally these were directed against the known "yaws black spots" of their areas, that is the emphasis was in continued control. But in some localities, particularly the survey areas served by a fixed centre, investigations have been conducted more with the aim of observing disease behaviour. These were all ad hoc yaws investigations. In addition yaws prevalence is investigated and treatment given to cases during the course of polyvalent surveys; yaws treatment is also given during other ad hoc surveys, for example during S.haematobium investigations in school children for it is a dictum of M.F.U. never to miss any opportunity to treat a case. In addition cases of yaws have attended voluntarily at the M.F.U. fixed centres of the regions.

Table 5 sets out the results of the L.T.S. in these three units. It will be seen that there were two L.T.S. programmes in the N.E. in 1961 in the same areas. The first was the last part of a region wide L.T.S. which should have been completed in 1960 but was delayed by an epidemic of C.S.M.

In the N.W. the L.T.S. programme was the completion of a similar comprehensive investigation begun in late 1959. The Tumu and Western Gonja resurveys were made by centre staff.

In the Volta Region the northern part of the country was fully covered on an L.T.S. combined with a polyvalent survey. See also Map 4.

In addition these units carried out, in conjunction with other work, certain yaws surveys which are difficult to present simply. These are indicated in Table 6.

The number of cases treated without the examination of a whole community e.g. during the course of ad hoc surveys for onchocerciasis or bilharziasis or cases attending voluntarily at centres are shown in Table 7.

TABLE 6.

Other yaws work carried out by the North East, North West and Volta Region Units in 1961

<u>Unit</u>	<u>Areas</u>	<u>Persons examined</u>	<u>Yaws cases</u>	<u>% Yaws Infectious</u>	<u>% Yaws Total</u>
			<u>Infectious</u>	<u>Total</u>	
North-East	Mainly in s.s. foci	74,078	57	369	0.08 0.5
North-West	Mid-Volta	10,396	5	21	0.05 0.2
Volta Region	sample survey i.e. stage 2 L.T.S. Central Part of the Region.	42,755	35	158	.08 .37
Total		127,229	97	548	.08 0.43

Table 7

Other cases of yaws treated at fixed centres and in other surveys by the North East, North West, Volta Region Brong Ahafo, Ashanti and South East Units

	<u>Bilharzia Surveys</u>	<u>Oncho Surveys</u>	<u>At Centres</u>	<u>Total</u>
North-East	127 (151)	-	- 37 (74)	164 (225)
North-West	- -	-	- 68 (133)	68 (133)
Volta Region	- -	21 (28)	140 (326)	161 (354)
Brong Region	6 (6)	-	- 6 (27)	12 (33)
Ashanti Region	- -	-	- 57 (127)	57 (127)
Southern Region	11 (11)	-	- 247 (553)	258 (564)
Total	144 (168)	21 (28)	555 (1240)	720(1436)

The first figure is the number of Infectious Yaws cases.

The second, in brackets, is the total number of cases.

Examination of the Tables 5-7 regarding the Phase 2 or L.T.S. position of yaws makes it immediately obvious that in general the prevalence of the disease is well within the Phase 2 bounds set by W.H.O. It is less prevalent in the N.W. of Ghana than on the other side, and in the east the remaining core of the disease is to the south of Yendi. If the records from a large area are examined as a whole small pockets of high prevalence will be completely masked. The findings in two survey areas of the N.E. which are contained within Table 5 are therefore worth presenting in greater detail; these areas are Tuluwe, 40 miles south-west of Tamale and Kworle, 40 miles south-east of Yendi, along the border with Togoland.

In Tuluwe the population is 1,600. The prevalence of infectious yaws on the I.T.S. in April 1957 was 8%, 127 cases. On the R.S.S. the numbers were 16, 6, 2, prevalences 1%. 0.37% and 0.12%. This seemed to be satisfactory. On the first L.T.S. which was made in April 1961 (2 years after the 3rd R.S.) there were 36 cases of infectious yaws, 2%. Another L.T.S. was made in December 1961 there were only 6 cases, 0.3%

In Kworle the "relapse" situation was worse. This area has a population of about 5,500. On the I.T.S. and three resurveys the number of cases of infectious yaws were 92, 21, 44, 17 with prevalences of 1.7%, .4%, .8% .3%. At the L.T.S. in 1960 the number had risen to 151, a prevalence of 2.25%. The second L.T.S., made in June, 1961 found 57 cases .74%.

It may be repeated that the unsatisfactory 1961 records of these two areas are contained in the North East figures in Table 5, the overall picture which the Table gives with a prevalence of 0.17% infectious yaws, demonstrates the need to examine the records in considerable detail.

Both Kworle and Tuluwe are good examples of what can happen within a short period of an apparently satisfactory completion of Phase 1 if this is not succeeded by an active case finding Phase 2.

The Brong Ahafo Unit completed phase 1 during the year and began Phase 2 and in this work covered the Kintampo area (from the fixed centre) and part of the Atebubu District, in the course of a polyvalent survey for trypanosomiasis, onchocerciasis and doing vaccinations.

There is an unusual relationship in the numbers of infectious to total yaws at Atebubu. The Kintampo results are satisfactory.

Summary

The work of M.F.U. against yaws in 1961 can be summarised in the following table.

Examinations	yaws Cases		% Yaws	
	Infectious	Total	Infectious	Total
Phase 1 I.T.S. 580,211	2,568	16,639	0.44	2.87
Ist.Rs. 39,086	23	94	0.06	0.25
Final Rs. 439,942	497	3,447	0.11	0.78
1,059,239	3,088	20,180	0.29	1.9
L.T.S. 622,326	738	2,562	0.12	0.4
Other yaws work 127,229	97	548	0.08	0.4
1,808,794	3,923	23,290	0.22	1.3
Other yaws cases treated at M.F.U. fixed centres and on other surveys	720	1,436		
Total Cases Treated	4,643	24,726		

3. Onchocerciasis

The role of M.F.U. in relation to this disease is twofold. In the first place it is our duty to plot out the distribution and the prevalence patterns within the distribution, this work is carried out by the mobile teams of the separate medical units. Secondly, through the agency of the Simulium Control Unit, we carry out field trials in a limited area in preparation for the wider application of specific vector control.

At the moment M.F.U. does not undertake mass treatment of the cases of infection discovered during the surveys. It is understandably difficult for the public to appreciate why this is not done; but there is no means available at the moment which is suitable for mass application. In 1955 and 1956 some 7,000 infected persons in Upper Ghana were given a course of antrypol, but it was hardly successful.

The control of any communicable disease by M.F.U. requires that we should be provided with a blue print scheme ready for execution. Those engaged in research have not been able to keep pace with the demand for the control of onchocerciasis. There are still serious gaps in our knowledge of the basic epidemiological data, for example how S.damnosum survives the dry season, and the factors which, in addition to infection with O.volvulus determine whether or not a person living in an endemic area of the disease becomes blind. If answers were available to those two questions alone they would probably radically alter our views regarding control.

In the meantime with the construction of the Volta dam, and perhaps other large dams in the country, prevention of infection in those areas has become pressing: the only means available at the moment is in control of the vector.

TABLE 5

A comparison of findings in 200 persons examined for infection with *O. volvulus* by 2 methods (a) skin snip (b) scarification: the examination being made at 5 different points of the body

(a)

Microfilaria of oncho volvulus in the skin

Persons Examined	Calf					Trochanter					Chest					Scapula					Neck				
	ss	%	st	%	ss	%	st	%	ss	%	st	%	ss	%	st	%	ss	%	st	%	ss	%	st	%	
200	98	49	123	61.5	117	58.5	144	72	79	39.5	81	40.5	68	34	79	39.5	49	24.5	55	27.5	73	83	71	66.5	58.5

S.S. - skin snip

S.T. - scarification test

The superiority of the scarification over the skin snip method

site	% positives		S.T.
	S.S.	S.T.	
Calf	49	61.5	
Trochanter	58.5	72	
Chest	39.5	40.5	
Scapula	34	39.5	
Neck	24.5	27.5	

Comparison of the value of different sites

Site where tests were made	% positives				Scarification test
	skin snip	trochanter	chest	scapula	
Calf	73	83	72	81	
Calf	72	83	71	80	
Calf	71	81	66.5	72	
Trochanter	66.5	72	58.5	72	

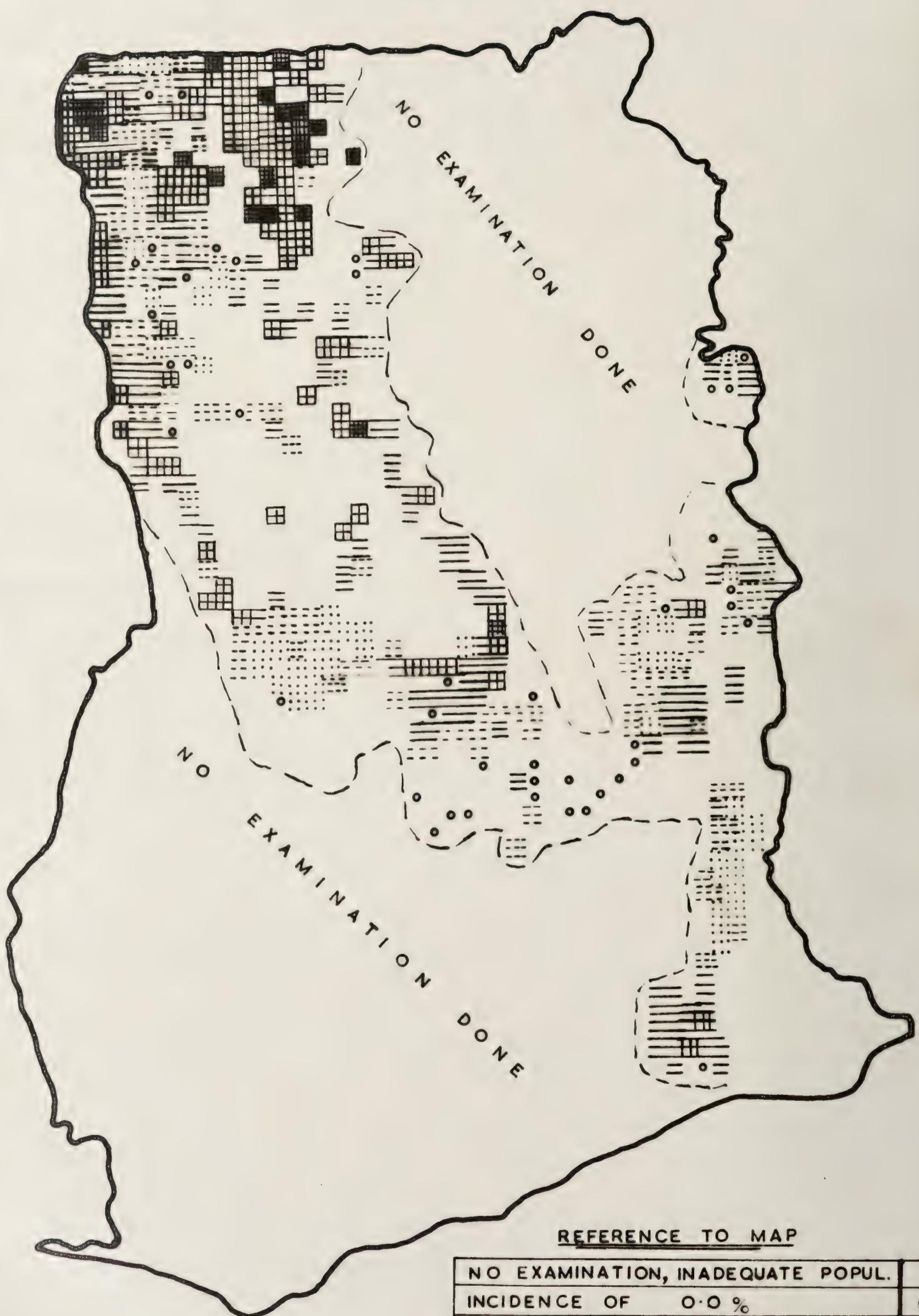
(c)

M.F.U. surveys for infection

In order to obtain a picture of the distribution and the prevalence within this distribution which will be comparable over the whole country investigation procedures are standardised. Infection is sought only in adult males, aged 21-40. A single examination is made from a skin snip taken from the calf and examined in saline. Although streptocercal infection may occasionally be included it is generally agreed that the microfilariae which are found are, with few exceptions, O. volvulus, so that fixing and staining of the preparations is unnecessary. Towards the end of the year Dr. Onori (Volta Region Unit) began a series of investigations to determine the relative value of scarification (S.T.) vis-a-vis skin snip (S.S.) and also to determine which is the best site on the body from which specimens can be taken. His findings are presented in Tables 8 a.b.c. They indicate that scarification is certainly the more valuable method for diagnosis than skin snip and that the trochanter is the most useful site to select. Onchocerca investigation techniques in the field will be modified to apply this information as usefully as possible. Only in the Volta Region, in parts of Brong Ahafo and in a restricted area of the North East were investigations made for onchocercal infection in 1961. (This work was completed in the North West sometime ago). In the North East more urgent control programmes permitted only limited investigations to be made in 1961; the Ashanti and South-East Units were fully committed with their Yaws Control Programmes. In the Volta Region a considerable population was examined; the whole of the northern part and also the survey areas lying adjacent to the Volta as far south as the Akosombo dam site. In the north the prevalence of infection is about 18% by our method of diagnosis; but at Frankadua it is 60% (see Table 9). The new dam site is in the middle of this focus. The need for a comprehensive and carefully planned combined entomological and medical investigation is very apparent.

MAP 6

DISTRIBUTION AND PREVALENCE OF ONCHOCERCAL
INFECTION IN AREAS OF GHANA SURVEYED FOR
THE CONDITION FROM 1958 — 1961



REFERENCE TO MAP

NO EXAMINATION, INADEQUATE POPUL.	
INCIDENCE OF 0·0%	•
— 5·0%	···
— 15·0%	····
— 40·0%	====
— 70·0%	=====
— 100·0%	=====

In Brong Ahafo the examinations were made in the course of a polyvalent survey which was being carried out in the Atebubu district; and by the Kintampo centre staff in their allocated areas. The prevalence of infection was much higher than might have been expected in both areas, 32% and 35% respectively.

Map 6 represents the present state of knowledge of the distribution and prevalence of O. volvulus infection in adult males in the North East and North West of Ghana and in parts of the Volta, Brong Ahafo, Ashanti and Eastern Regions.

The fixed centre at Ejura (Ashanti Unit) also made surveys for the infection in their area of responsibility. In the Ejura survey area itself 1,500 adults males were examined. Of these 87 or 5.8 percent were infected. The distribution of infection among the different tribal groups is revealing:

<u>Group</u>	<u>Number examined</u>	<u>+ ve s.snip</u>	<u>% + ve</u>
Ashanti	603	22	3.6
Gonja, Dagomba, Kokomha, Basare	375	10	2.7
Mamprussi and related people	234	16	6.4
Dagarti and related people	51	7	3.5
Moshie	77	20	26
Others	<u>160</u>	<u>12</u>	<u>8</u>
	1,500	87	5.8

This points to certain matters that require investigation. Is this high prevalence in the Moshies acquired locally, that is are they exposed as labourers to some special occupational risk, or do they enter the area with a high load of infection in the first place? If so then their employment in large number at dams sites will be an important matter. It will be remembered that Moshie males also show a relatively high prevalence of trypanosomiasis in Ashanti, full investigation has shown this to be of local origin and related to their employment. This table also indicates the need to restrict our examination for O. volvulus as far

TABLE 9.

Onchocercal infection found by survey units
of M.F.U. in 1961 operating in 5 regions of
the country.

<u>Unit</u>	<u>Adult Males Skin snipped</u>	<u>Positives</u>	<u>Percent</u>	<u>Total Populations from whom sample was made</u>
North-East	348	105	30.2	9,444
North-West	260	88	33.85	1,486
Volta-Region	10,229	2,099	20.52	73,513
Brong-Ahafo	2,699	969	35.90	15,058
Ashanti	2,771	202	7.29	10,876
Total	16,307	3,463	21.24	110,377

as possible to indigenous people; however Ejura is a particularly busy centre and even so the inclusion of the itinerant element makes little difference to the final prevalence 3.6% in Ashantis and 5.8% in all people examined. For we are concerned rather with discovering whether the incidence of infection is 3 or 30% not whether it is 3.6 or 5.8%.

Simulium Control Unit

This unit was formed in 1957. Its original objective was to try to implement the recommendations of a report which had been submitted to the Government and which, in effect stated that although breeding of S.damnosum on side streams might be important an effort should be undertaken to control the insect by applying insecticide to a limited number of points in a few of the larger rivers and streams of Upper Ghana where breeding was known to be very prevalent. The work of the unit during its earliest days was directed to this trial but it became obvious that dissipation of our efforts and resources over a large area was leading nowhere in particular, for example efficient dosing of the Sissilli river just above the bridge gave an unsatisfactory reduction of flies collected there; breeding from other streams was obviously an important factor. In 1960 we lowered our sights, the work of the unit was concentrated in the Tumu/Lawra and Wa areas; but even this was too large and in 1961 the area was reduced to the Lawra and Wa districts bounded by the Black Volta in the west and the Kulpawn watershed to the

east. It is gratifying to report that genuine progress has been made towards achieving our objectives. These can be stated as:

- (i) to determine what resources are required in terms of man power and materials to control S.damnosum within a limited and prescribed area,
- (ii) what is the relationship between expenditure and results in terms of fly control. For example is a 90% reduction of fly achieved fairly readily, but does further reduction demand vastly increased expenditure?

The first stage has been to map out as carefully as possible all the river and stream systems of the area; the whole length of waterways which lie to the north of the Boundary River have been fully surveyed in both the wet and dry seasons. Places which, in the dry season, appeared to be likely breeding spots of S.damnosum were marked on the map and revisited weekly for a time during the rains; other stretches of the streams were also examined at this time. On 47 rivers and streams and 3 dams breeding was found in 7 of the former - including the Black Volta and in one dam. North of the Boundary River there appears to be 8 general breeding sites in the Ghana stretch of the Black Volta. Except on the Kamba River and on one other stream the remaining breeding sites are all close to the junction of the incriminated streams and the Volta itself. The problem of simuliid control therefore in this area of about 1,000 square miles with a population of 100,000 of whom some 40% of the adults are infected with O.volvulus is not so deterring as it first appeared. Although these breeding points are not easily reached and all weather vehicle tracks will have to be made it should be possible to dose these points at weekly intervals. It is the Black Volta, however, which can produce the greatest number of fly.

Control work carried out during the year was limited to those rivers where there was previous base-line data on fly densities, the Black Volta and the Kamba. "Didimac 25" was used at a concentration of 0.05 to 0.1 p.p. million. The number of dosing points on these rivers was determined by various factors, including the state of the river, whether in flood or at a low level. Post dosing examinations showed on almost all occasions that there had been a total clearance of S.damnosum larvae at the examination points down stream.

Regular dosing of the Black Volta has been carried out during the last 3 years. This has reduced the fly counts at most seasons, and in the dry weather when counts are greatest this reduction was most marked, the numbers remaining being a mere fraction of what they were before as shown:-

January fly density at catching points on the Black Volta
in fly/collector/hours

	<u>Kamba mouth</u>	<u>Mombello</u>	<u>Dobo</u>	<u>Buga</u>	<u>Kpamfa</u>
1959	12.4	24	1.96	4.37	9.45
1960	.98	1.7	2.9	.12	1.0
1961	1.5	.75	no record	2.72	3.3

It has been found in other parts of West Africa that consistent dosing of this type has a pronounced effect, which is continued after the operation is stopped. As with so many problems affecting public health it is essential that the control of S.damnosum in Ghana should be integrated with a programme in surrounding countries.

TABLE 10

Results of field surveys made in 1961 by M.F.U.
among boys aged 5-15 years for infection with
S.haematobium

<u>Unit</u>	<u>Estimated Population</u>	<u>Boys Exam.</u>	<u>Number infected</u>			<u>% of infection</u>		
			S.haem. +ve	r.b.c. only	Total	S.haem. +ve	r.b.c. only	Total
<u>North-East</u>								
E.Dagomba	107,618	15,628	82	9	91	0.52	0.06	0.58
W.Dagomba	82,326	9,384	428	1	429	4.56	0.01	4.57
E.Gonja	32,097	3,931	72	7	79	1.83	0.18	2.01
Total	222,041	28,943	582	17	599	2.01	0.06	2.07
<u>Brong-Ahafo</u>								
Wenchi	15,909	1,988	194	40	234	9.76	2.01	11.77
Atebubu	27,989	3,572	256	85	341	7.16	2.38	9.54
Total	43,898	5,560	450	125	575	8.09	2.25	10.34
<u>Ashanti</u>								
SEKODUMASI	5,472	239	5	-	5	2.1	-	2.1
Adudwan	2,949	198	1	-	1	0.5	-	0.5
Total	8,421	437	6	-	6	1.37	-	1.37
<u>South-East</u>								
Akuse	18,647	1,343	62	5	67	4.62	0.37	4.98
Akwamu	5,173	795	19	1	20	2.39	0.12	2.52
Osudoku	7,704	723	22	2	25	3.04	0.41	3.46
Ada	39,993	2,943	188	11	199	6.39	0.37	6.76
Total	71,517	5,804	471	20	491	8.12	0.34	8.46
Grand Total	345,877	40,744	1,509	162	1,671	3.70	0.40	4.10

4. Bilharziasis

The Medical Units

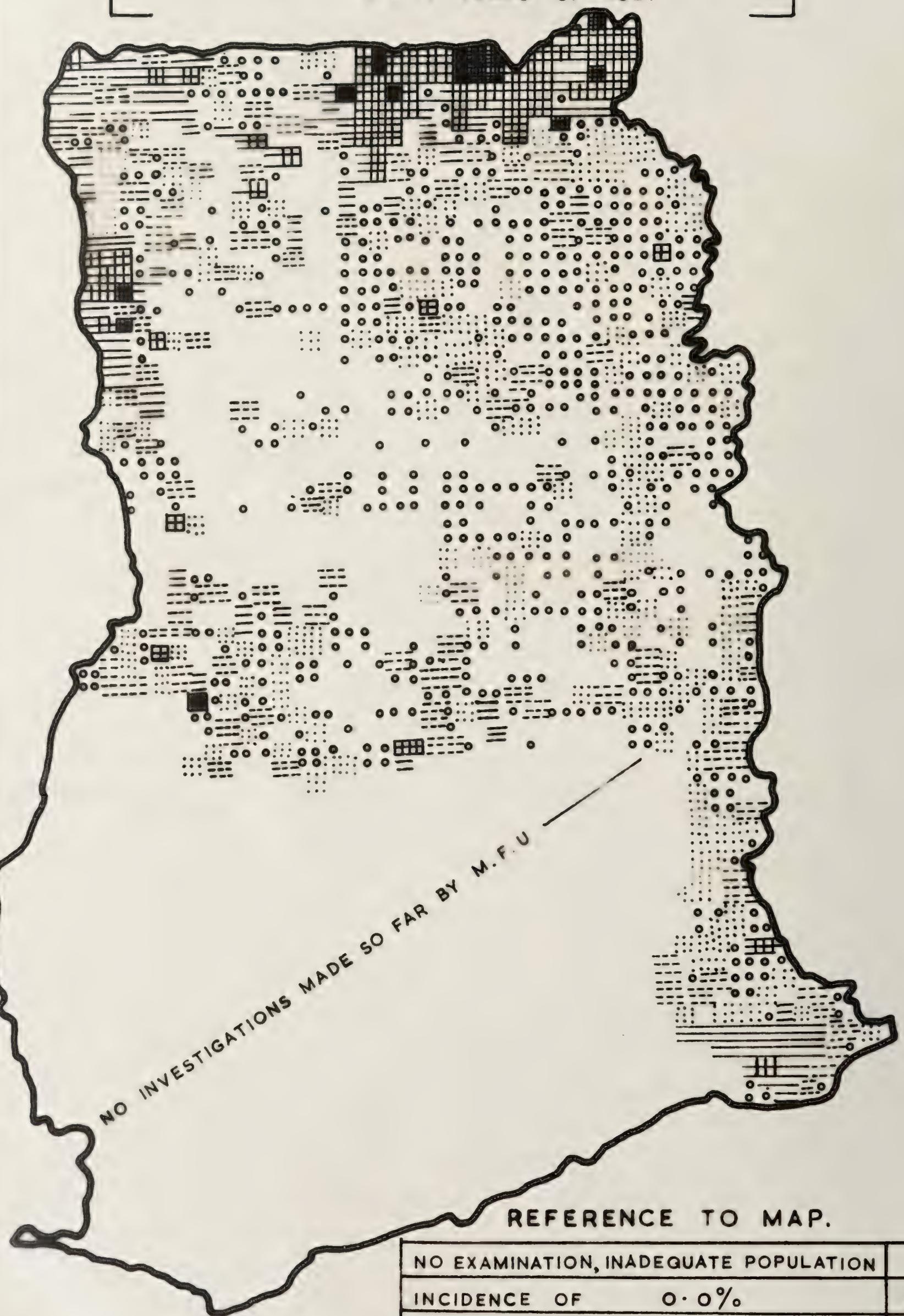
Here again M.F.U. is concerned in plotting out the distribution of the disease and the different prevalences within that distribution. Mass treatment of cases is not undertaken for the same reason as with onchocerciasis, that there is no means of control which can be applied to whole populations which is safe and effective. This survey work which began about two years ago had been directed towards gaining information about S.haematobium infection; an examination is made of a urine specimen from a sample of boys aged 5-15. Mostly these investigations have been carried out by small, fast moving ad hoc teams of 2 or 3 technical staff who visit every community within the Unit's Region. In villages where there are less than 10 boys of this age no examinations have been made in the past on the grounds that the significance of prevalences in few examinations is very doubtful. In no community are more than 100 boys examined. As far as possible schools are used and care is taken to select for investigation only those who are indigenous to the area.

Before 1961 these investigations were completed in the North West and Volta Units' areas. They were concluded at the end of 1961 in the North East. The work was continued in Brong Ahafo. The Ashanti Unit used the staff of their Ejura centre to obtain information about the disease in the area. The records of this year's investigations are shown in Table 10; in all areas the prevalences were remarkably low, in the districts of Eastern Gonja and Eastern Dagomba for example, prevalences

MAP 7

DISTRIBUTION OF S. HAEMATOBIUM IN PARTS OF GHANA.

BASED ON 1959-1961 SAMPLE EXAMINATIONS OF BOYS
5 - 15 YEARS OF AGE.



REFERENCE TO MAP.

NO EXAMINATION, INADEQUATE POPULATION	
INCIDENCE OF	0.0%
—	5.0%
—	15.0%
—	40.0%
—	70.0%
—	100.0%

were, in general so low that it is clear that in these areas transmission of infection is not taking place, the infections found having been acquired elsewhere. It is a matter of some importance when interpreting the pattern of the distribution to decide at what low level of prevalence we might consider that local transmission is not occurring. During these surveys carried out by the Medical Units snails hosts are looked for at each village, and collections made.

Map 7 is a miniature of the grid map distribution of bilharziasis. The prevalence of infection is shown separately for each square of 5 minutes of latitude and longitude on the map, an area of 36 square miles. (This newly introduced method of portraying the patterns of distribution and prevalence has been described in Part I of the Report). When distribution maps showing intermediate hosts have been prepared by the Bilharziasis Control Unit it will be possible to correlate these with the distribution of the disease.

The distribution of S.haematobium in Ghana is very widespread, it is not so much a matter of where the disease is found or where it does not occur as determining the prevalence within its distribution. The position with S.mansoni is quite different. This disease has a very restricted dispersal in Ghana. It was intended that limited surveys would be made for this second infection in areas of the country where it was thought it might occur, or where the specific hosts have been found, or where S.haematobium is very prevalent. Such a sampling system would have obvious limitations and it was therefore decided towards the end of the year to carry out stools surveys on the lines of the S.haematobium investigations,

this would provide a distribution pattern not only for S.mansoni but of the more common intestinal parasites and would be a useful contribution to our knowledge of disease prevalence. These surveys were begun by the North West in the Wa district in the latter part of the year. An interesting fact came to light immediately. A high prevalence of S.mansoni was discovered in one of the Wa schools. Although S.mansoni has only rarely been recorded at Wa hospital the Bilharziasis Control Unit (see below) found an abundance of Biomphalaria pfeifferi in nearby ponds and were able to forecast that S.mansoni infection might be discovered locally.

The Bilharziasis Control Unit

A Snail Control Unit was set up within M.F.U. in 1956. In 1959 an officer from W.H.O. joined this unit, and in 1961 a biologist was appointed to fill a government post which had been vacant for some years. The objective of this unit was to prepare the ground for a possible large scale bilharziasis project, to carry out investigations into the distribution and ecology and other matters relative to the intermediate hosts.

In 1960 the Ministry of Health considered a large scale control project for the Eastern Region but later this was replaced, in 1961, by a proposal for a small project near Wa. This particular area was selected because there is a focus of S.haematobium infection which is more or less isolated and there are many other features which make it a sound choice; there is an M.F.U. headquarters in Wa, a division of the Rural Water Department.

the focus covers a Land Planning Area which has been well surveyed and mapped, and so on. The wa Bilharziasis control Project will be run jointly by W.H.O. (who will supply some staff and equipment) and the Ministry of Health. It is estimated that control of transmission in this pilot area, which has a population of about 40,000 will take about 5 years and the experience gained will determine what further action will be taken in Ghana to deal with the major bilharziasis areas, in North Mamprussi.

In preparation for this Project the snail control unit was moved from Kintampo to wa in August and a Bilharziasis Control Unit formed, with the Medical Officer of the N.W. M.F.U. in charge. At this point it became clear that there would be some delay in implementing the scheme but the time of the unit has not been wasted; it has been busily engaged in collecting base line data in the project area, in particular the distribution of snail hosts accurately plotted on maps. Staff had to be trained and the laboratory developed for in addition to field work the Unit conducts laboratory investigations; these have been designed to study, for example:

- (1) the depth preferences of snails in aquaria
- (2) the importance of Bulinus forskalii in transmission of human schistosomiasis
- (3) the importance of Biomphalaria pfeifferi in the wa ponds in transmission of infection
- (4) how long cercariae live
- (5) the length of time infected Biomphalaria will continue to shed cercariae
- (6) the periodicity in shedding of cercariae.

The observations made and conclusions reached are too detailed for presentation here and some of them will be prepared for publication in due course.

5. Guinea worm infection

Where surveys are being made in whole populations, not just in selected groups as in the ad hoc bilharziasis investigations, the teams record the cases of guinea worm infection. No treatment is given and no control measures are applied. The purpose of making these records is to collect as much information as is available, but its value is limited for the disease is markedly seasonal; in mid-rains a community will show little infection whilst at the end of the dry season infection may reach a high prevalence among the same people.

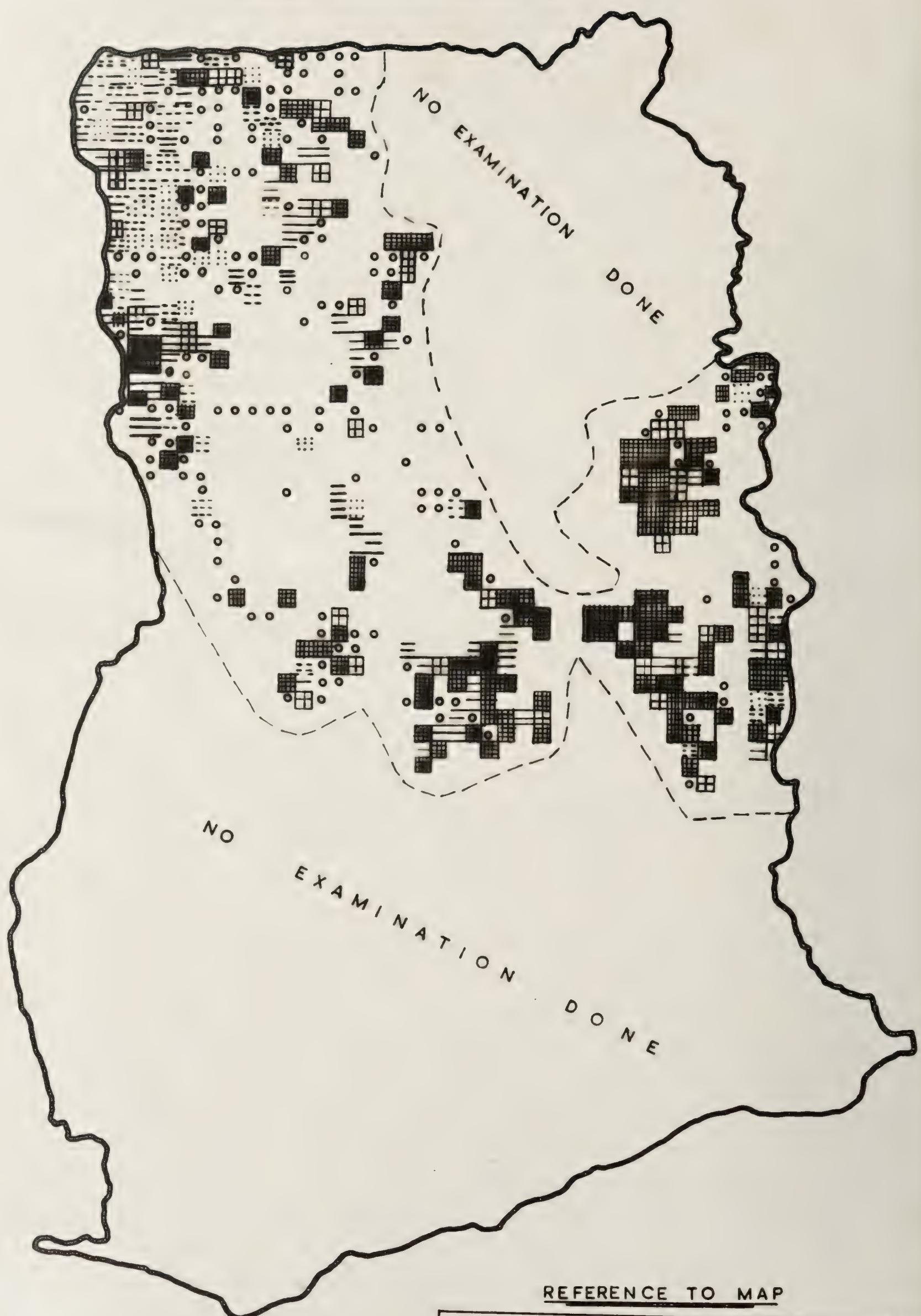
The surveys made by polyvalent teams in 1961 found the following:

	<u>Villages Visited</u>	<u>Infected</u>	<u>Persons examined</u>	<u>Cases</u>	<u>Incidence percent</u>
Upper Region	611	186	133,594	893	.67
Northern Region	453	86	69,797	216	.31
Brong Ahafo	113	20	18,422	98	.5
Ashanti	59	4	12,019	6	.05
Volta Region	<u>180</u>	<u>22</u>	<u>36,714</u>	<u>69</u>	<u>.2</u>
Total	1,416	318	270,546	1,282	.47
	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>

Guinea worm infection is probably either completely absent from a community at all times or it occurs with the usual seasonal variations; an important fact to establish at any point is whether or not the disease is naturally endemic there and it may require a whole year's observation to settle the points; the second issue to determine is whether or not the disease is important economically, in some localities over 10 percent of the population may be affected at the very time the farming season is about to start. The information which we collect limited though it is, should be useful to those who are engaged either directly or indirectly in the control of environmental disease, public health workers, the social welfare and rural water departments; but only exceptionally are we asked for information.

MAP 8

DISTRIBUTION AND PREVALENCE OF LEPROSY
IN AREAS OF GHANA SURVEYED BY M.F.U
FIELD TEAMS IN RECENT YEARS



REFERENCE TO MAP

NO POPULATION	
INCIDENCE OF 0.0%	•
0.05%	•••
0.15%	---
0.40%	
0.70%	██████
1.0%	██████████

6. Leprosy

Leprosy is diagnosed during the course of the polyvalent surveys. The cases found are told about their illness and advised to take treatment at the nearest Leprosy clinic. In these days most of the cases appear to be under treatment already. The distribution and prevalence of the disease is shown in a miniature grid map - Map 8 - which is built up from the results of surveys made in recent years. The records of our investigations in 1961 were:

<u>Region</u>	<u>Examinations</u>		<u>Cases</u>		<u>Incidence</u>
	L.	N.	Total		
Upper Region	133,594	57	411	468	.35
Northern Region	69,797	142	527	669	.96
Brong Ahafo	18,422	12	75	87	.47
Ashanti	12,019	1	21	22	.18
Volta Region	36,714	34	474	508	1.38
T o t a l	270,546	246	1,508	1,754	.65

L & N refer to lepromatous and non-lepromatous infections

The very remarkable feature here is the higher prevalence of the disease in the Volta Region. This was also commented upon last year. The area surveyed there by the Unit in 1961 was on the most northernly part of the Region; it is shown in the grid map.

Only the Ashanti and Brong Ahafo Units carry out the treatment of leprosy, doing this at their fixed centres, Kumasi, Ejura, Yeji and Kintampo. Formerly cases were treated in the north but as the Leprosy Service expanded

this work was returned to them. It is expected that in the normal course of event these remaining functions will pass out of our hands.

The number of patients treated at these centres in 1961 is summarised:-

<u>Clinic</u>	<u>No.brought fwd. from '60</u>	<u>Admitted</u>	<u>Total</u>	<u>Discharged follow up</u>	<u>Trans- ferred</u>	<u>Went away</u>	<u>Died</u>
Kumasi	244	59	303	2	8	73	.
Ejura	73	12	85	2	4	16	.
Yeji	61	34	95	4	2	16	.
Kintampo & neighbouring clinics	105	18	123	.	5	21	.
	—	—	—	—	—	—	—
T o t a l	483	123	606	8	19	124	
	—	—	—	—	—	—	—

A 25% "went away" total for the year is particularly disappointing, it was the same figure last year. A less than 3% discharged rate to follow up among the remainder is also disappointing.

The treatment is with D.D.S.; only one reaction was observed during 1961, an elderly patient at Yeji who developed dermatitis.

Epidemic disease

The two features of the year were the annual epidemic of cerebro-spinal meningitis in the north and the increasing attention which M.F.U. gave to the specific treatment of cases of measles during outbreaks of the disease.

There were no cases of yellow fever or outbreaks of anthrax reported in Ghana in 1961. The total number of smallpox cases notified during the year was 70 and M.F.U. was not called in to deal with any of the restricted outbreaks which occurred; vaccination was carried out wherever possible by field teams.

1. Cerebro-spinal meningitis

Prior to 1961 the responsibility for dealing with epidemic cerebro-spinal meningitis in the north had lain with the P.M.O./M.O.H. of the Upper and Northern Regions, M.F.U. being called in only when the cases were too numerous to be dealt with by the local staff. On several occasions this had resulted in a call to action being received rather late in the day, for by the time a village overseer had passed on information of an epidemic in his area and this had travelled to Tamale by way of the local health inspector, health superintendent and district medical officer and thence to the M.F.U. doctor at Wa or Gambaga a very considerable interval might have elapsed. It was therefore agreed towards the end of 1960 that from the 1st of January 1961 until mid April, i.e. during the C.S.M. "epidemic season", M.F.U. would take a continuously active role within the "epidemic area", which was defined as the Upper Region together with the Gambaga district of the Northern Region. The arrangement made and followed was that M.F.U. should together with the local health staff, carry out such case finding and propaganda activities, through scouts, as the circumstances required and M.F.U.

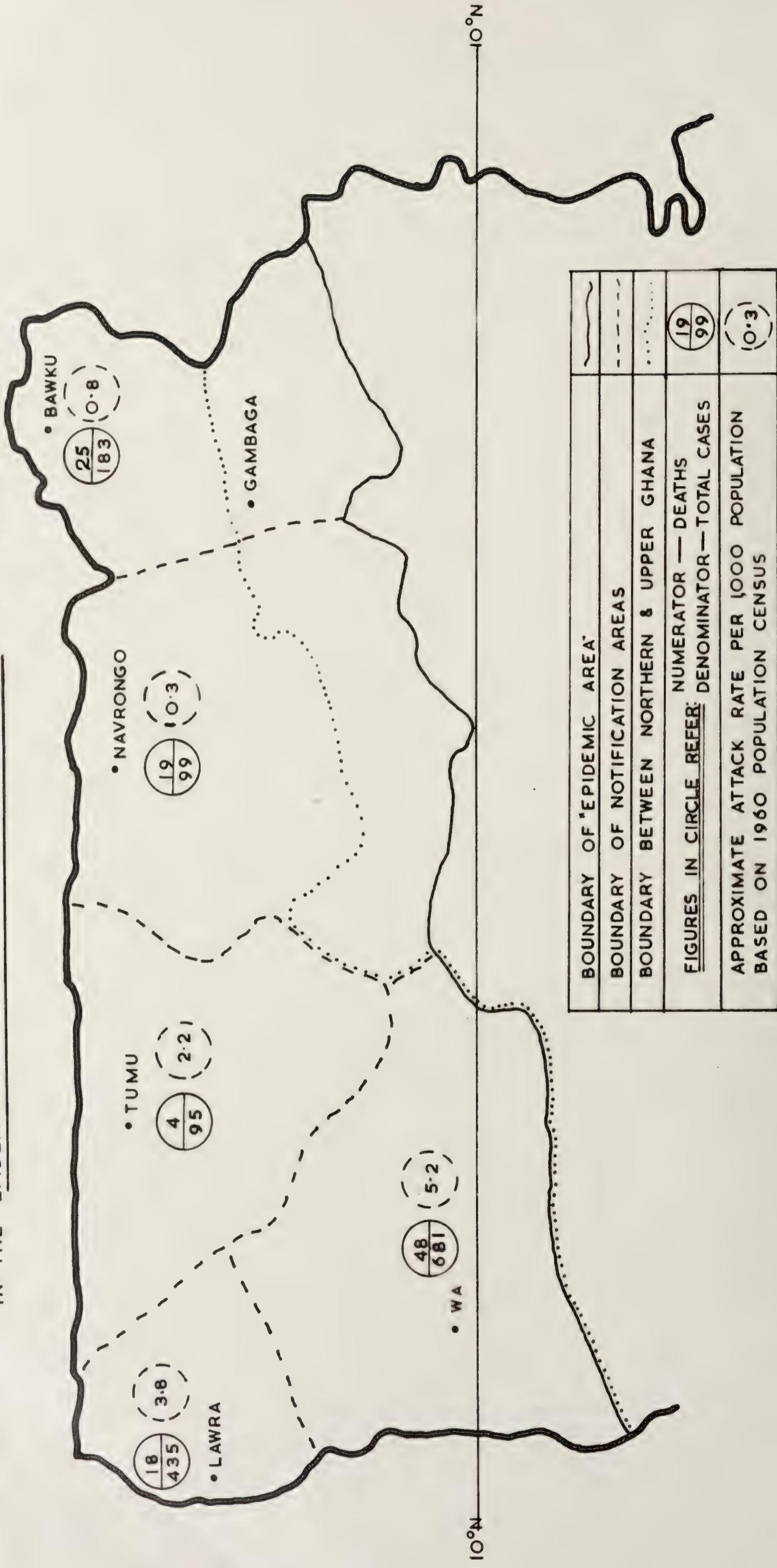
would open field camps where and when necessary. In some areas the local hospital was able to deal with all the cases, others required several camps. It was the duty of the M.F.U. medical officer to staff and run the camps from the beginning, and by constant liaison with the hospital medical officer and all paramedical authorities in his region to be able to keep a close watch on the ever changing situation. The M.F.Units was also responsible for the preparation and supply of forms on which individual records were kept and for compiling the records of the cases treated in their camps. The unit also obtained full information from the other centres of diagnosis, the hospitals, and for preparing comprehensive weekly and other returns which were sent to the office of the P.M.O./M.O.H. in Tamale as well as to M.F.U. Headquarters in Kintampo. Thus, for the first time, M.F.U. was constantly apprised of the situation and could anticipate what demands were likely to be made in terms of staff. It was felt by all concerned that this trial had been successful and arrangements were made to continue in this way in the future.

The epidemic of cerebro-spinal meningitis in the dry season of 1961 was not quite as large as that in the previous year. Their figures are compared below and refer to the "epidemic area" during the "epidemic season" (see above).

	<u>Cases of C.S.M.</u>	<u>Deaths</u>	<u>Mortality %</u>
1960	2,160	188	8.7
1961	1,493	116	7.8

The number of additional cases which occurred at any time in 1961 in the non-epidemic areas of the north was only 26. Thus, these figures, which were directly available to M.F.U. from the field, represent the behaviour of the epidemic very adequately.

MAP 9. LOCATION OF C.S.M. CASES AND PREVALENCE OF THE DISEASE BY DISTRICTS IN THE "EPIDEMIC AREA" DURING THE "EPIDEMIC SEASON" OF 1961.



Distribution, prevalence and case fatality rate

Once again the north-west of the country was affected by a larger epidemic than the north-east:-

District by district notification of cases of C.S.M.
from January 1st to April 15th, 1961.

<u>North East</u>	<u>Cases</u>	<u>Estimate prevalences per 1,000</u>	<u>Deaths</u>	<u>Fatality %</u>
E. Mamprussi	183	.8	25	13.6
W. Mamprussi	99	.3	19	19

North West

Tumu	95	2.2	4	4.2
Lawra	435	3.8	18	4.1
Wa	681	5.2	48	7
	<u>1,493</u>		<u>116</u>	<u>7.8</u>

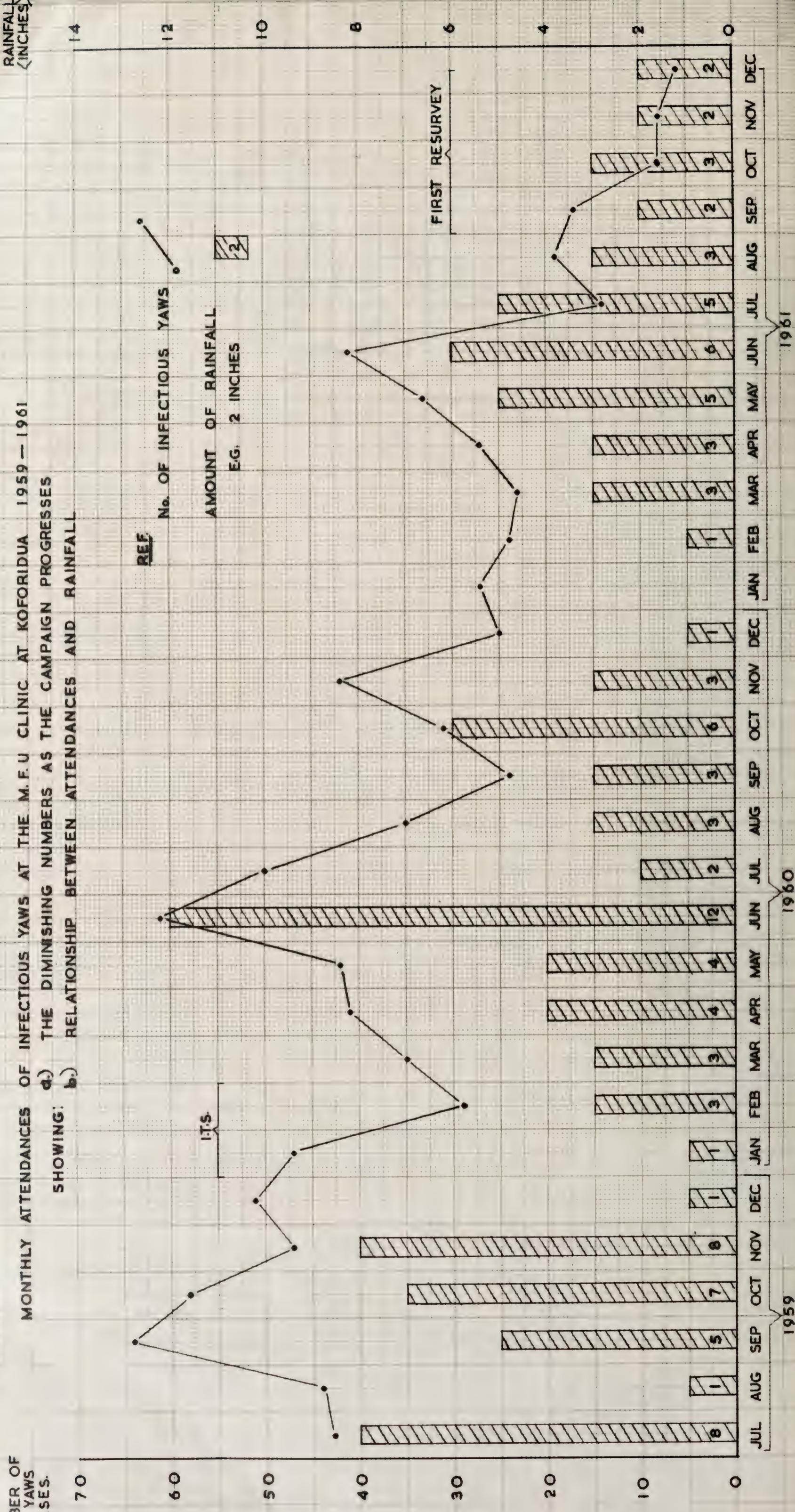
(see Map 9)

Not only were there more cases on the west side but the case mortality rate was significantly lower there. As lumbar puncture examination, and bacteriological confirmation of the diagnosis, was not made routinely during the course of the epidemic in the field camps (though the procedure was of course, maintained in hospitals) it is possible that a certain number of the cases were not, in fact, C.S.M. But the figure could only have been relatively small and cannot explain the difference. It may be that the massive organisation of voluntary "village scouts" which was introduced and operated by the M.F.U. medical officer at Wa had a great deal to do with bringing in cases in an early stage of the disease.

It has been a common experience in the past for the two sides of the north of Ghana to suffer markedly different prevalences during a particular year, for an epidemic cycle usually commences in the north-east corner of the country at Bawku, and in successive years moves westwards. The present sequence started in 1955:-

	<u>C a s e s</u>		
	<u>North East</u>	<u>North West</u>	<u>Total</u>
1955	41	4	45
1956	74	28	102
1957	318	12	330
1958	616	54	670
1959	313	39	352
1960	1,040	1,120	2,160
1961	282	1,211	1,493.

GRAPH I.



The same east to west movement over a number of years is seen in previous epidemic waves, the feature being very evident in the 1940s.

The impression has sometimes been gained that the virulence of this infection is enhanced at the beginning of an epidemic and decreases as the outbreak progresses. This was not so in 1961 when the case mortality rates for the first four months of the year were 11, 8.6, 6.5 and 9 percent respectively. But the epidemic was a small one and it is suggested that early increased virulence and subsequent decline is only found in the massive epidemics, such as 1945, 1949 and 1950.

Age and sex distribution of cases

Analysis of the records of the cases occurring in the North East showed the following distribution:-

	<u>Under 15</u>	<u>Over 15</u>	<u>Total</u>
Males	98	54	<u>152</u>
Females	<u>82</u>	<u>48</u>	<u>130</u>
	<u>180</u>	<u>102</u>	<u>282</u>

If we can assume that the under 15 age group accounts for about 45 percent of the population and that males and females are found in equal numbers the ratio of the attack rate in adults to children is 1: 2.1 (a similar predominance of the infection in children was found in the 1960 epidemic when the ratio was 1: 1.9) and it would appear that young males are most susceptible to infection and adult females least.

Trends in prevalence

The epidemic began in mid January and reached its peak in the third week of March (Graph 2). In the absence of early rains an epidemic almost invariably reaches its highest point at this precise time. It is probable that the outbreaks are initiated by the overcrowding which occurs at the time of the harmattan in late December and early January and that they are brought to an end by the effect of the rising temperature and humidity in the latter part of the dry season. But there are many and considerable gaps in our knowledge of the epidemiology and they require intensive field investigation (difficult where the medical officers of M.F.U. so often change) and laboratory research, for example into various bacteriological aspects.

TABLE 11

Results of Sulphonamide prophylaxis against epidemic c.s.m.
(see text)

Kaleo sub-district	Population	Before 14th Feb.		After 14th Feb.		Total for "epidemic season" per 1000 Prevalence per 1000
		Cases	Prevalence per 1000	Cases	Prevalence per 1000	
Locality A (8 villages given prophylaxis)	3,571	33	9.2	8	2.2	41 11.5
Locality B (8 nearby villages)	7,454	18	2.4	42	5.6	60 8.0
Locality C. rest of Kaleo (26 villages)	7,506	26	3.5	15	2.0	41 5.5
Mudawli sub-district (adjacent to Kaleo) All 35 villages	10,186	44	4.3	48	4.7	92 9.0
Rest of Wa District	102,256	81	0.8	366	3.6	447 4.4

Mass Prophylaxis

In 1960 the Medical Officer of the North East Unit gave sulphonamide prophylaxis in four separate and scattered villages in different parts of the area. This was the first systematic trial and an assessment of the results suggested that it had been effective for during the remainder of the epidemic season there appeared to have been less cases in those communities than in other comparable villages. The behaviour of epidemic C.S.M. is so unpredictable that it is necessary when making trials of prophylactic measures to select a relatively large number of communities which, together with the control villages, must cover a considerable district. In early February 1961 it seemed evident that an epidemic, sufficiently large for the purpose of making a trial of drug prophylaxis, was developing in the Wa district. Eight grouped villages (Locality A) were chosen in the Kaleo sub-district in which a number of cases had already occurred and a single dose of sulphathiazole was given to every member of the community on February 14th; this was repeated two weeks later. Eight comparable villages (Locality B) adjacent to the first group were chosen as the control community. The number of cases occurring from January 1st to February 14th, and subsequently to mid April together with the prevalence rates per 1,000 (based on a count made at this time) is given in Table II. In the same Table are presented data for the remaining part of the Kaleo sub-district (Locality C), for the whole of the neighbouring sub-district of Nadawli and for the Wa district (less Kaleo and Nadawli), but for these the population figures given were those obtained, not at the time of the trial, but at the 1960 census.

In the trial area the prevalence fell after prophylaxis from 9.2 per 1,000 to 2.2. In the remainder of the Wa district, (excluding Locality A), with its population of 127,000 the pre-mid February cases were 169; there were 471 after that date; prevalences 1.3 and 3.7 per 1,000. On the face of it these figures give very convincing evidence of the value of drug prophylaxis. But the question which must be asked is whether Locality A can be properly compared with the rest of the district, for in the eight villages chosen for prophylaxis the prevalence had already reached a high figure by mid February, 9.2 per 1,000. In the absence of prophylaxis would this have continued to rise at the same rate to a peak in mid March as occurred in the district as a whole? Unfortunately no study has previously been made of the behaviour of the disease in relatively small communities and it was not previously known whether the March peak indicated an absolute or only a general rule.

One or two relevant points emerged from examination of the records. In Locality A, 6 of the infections which were found after prophylaxis occurred in villages which had lower rates than before; but in one, Samatigu, population 352, which had two cases before February 14th there were subsequently four more - prevalence rising from 5.7 to 11.4 per 1,000 in each of the two periods. Perhaps not very convincing proof of the prophylactic effect of the sulphathiazole. Secondly in Locality C, which was the greater part of Kaleo sub-district, six villages which initially showed a relatively high prevalence before mid February, experienced a considerable decline, without of course having had any prophylaxis, this is shown:-

<u>Locality A</u> <u>Villages</u>	<u>Population</u>	<u>Cases before</u> <u>14.2.61</u>	<u>Cases after</u> <u>14.2.61</u>
Janguase	213	2	0
Boo	16	1	0
Kaha	219	3	0
Loho	379	4	1
Namvilli	691	9	3
Ombo	<u>156</u>	<u>4</u>	<u>2</u>
	<u>1,674</u>	<u>23</u>	<u>6</u>
		i.e.	i.e.
		(13.8 per 1,000)	(3.6 per 1,000)
Remaining 20 villages in this locality	5,832	3 (.5 per 1,000)	9 (1.5 per 1,000)

These two points in effect seem to suggest that

- (a) high village prevalences early in the epidemic may be followed naturally by low prevalences.
- (b) the apparently good results achieved by prophylaxis in Locality A can be matched in untreated villages.

The difference between the eight villages of Locality A and the six villages in Locality C which showed such a marked fall, is that those in Locality A were grouped and can be considered as a single population, the others were not, and for the purpose of the table above have had to be selected out of a total of twenty-six villages. This, of course, is an important difference.

All that can be said is that the results of the trial are certainly suggestive of the good effect of two doses of sulphathiazole but investigations should be carried out on a larger area. Unfortunately the behaviour of epidemic C.S.M. is too little understood that it is impossible to plan in advance where prophylactic measures should be applied. This means waiting until an epidemic begins, but as we have seen it is inadvisable then to pick out the community most involved, others within the affected areas should be selected.

2. Measles

During the last two years M.F.U. has been increasingly concerned to determine its role in dealing with epidemics of measles. The first step was to try and obtain as much information as possible from available sources about the behaviour of the disease. There were no reports and among those who had long experience in medical institutions in the north, where the epidemics appeared to have been most severe, there were considerable differences of opinion as the answers to a questionnaire showed. In mid 1960 the N.E. unit at Gambaga undertook trials, the purpose being firstly to establish the manner in which M.F.U. might operate, and secondly to collect simple epidemiological data.

The role of M.F.U.

By 1961 our role had become more evident and during the year staff were trained in the diagnosis of the disease and the treatment of its complications. Small teams of two persons can be withdrawn from polyvalent field work when information is received about an outbreak. The system which is employed is immediate inspection of all the children in the infected village, treatment of those cases with complications of the disease and re-examination of all cases daily to discover additional sequelae; and the people are also asked to bring any fresh infections for examination. The treatment given to the sequelae, enteritis, broncho pneumonia, otitis and conjunctivitis is mainly by the sulphonamides and penicillin and is standardised, (as are all treatment schedules in M.F.U.). There is no doubt of its effectiveness for in the past the mortality rate in cases with lung and intestinal complications has been appalling, although naturally no figures are available regarding untreated cases. Soon the North West unit undertook this work too, and the Brong Ahafo unit were also required to deal with a small outbreak in the north of their Region.

Epidemiological data

Systematic record keeping and submission of returns began at the end of February, after the trial period.

The outbreaks were in the north, in the Upper and Northern Regions and the most northerly point of Brong Ahafo was also involved - at Kadelso. This distribution may be more apparent than real and due to the activities of the northern units; but the impression has been gained for a long time that severe outbreaks are not so common in the south. This point requires investigation.

M.F.U. staff saw 1,134 cases in children in villages with a total population of 7,515 under 15 years of age, an attack rate of 15.3 percent in those communities. There were also 14 cases in persons over 15. There were 38 deaths a case fatality rate of 3.3 percent. The distribution of the cases treated was:-

North East	90.8 percent
North West	7.2 percent
Brong Ahafo	2 percent

The number of cases seen by M.F.U. can represent no more than a relatively small part of the total which occurred. It is hoped that in future years the public will increasingly realise the value of the work of the teams and call on them whenever necessary though it must be confessed that in the great epidemics of the size of that which occurred in 1957, when every community in the extreme north seemed to have been attacked, the staff would be quite insufficient.

Of the 1,148 cases, 779 or 68 present had complications of the disease:-

Gastro-enteritis	478)	
Broncho pneumonia	192	1,191 (many patients
Stomatitis	143	had more than
Conjunctivitis	314	one of these
Otitis	64)	conditions)

In 1961 the outbreaks occurred exclusively in the dry season. Below, the monthly numbers of cases and the separate communities involved are shown alongside the Tamale rainfall.

<u>Month</u>	<u>Rainfall in Tamale in ins.</u>	<u>No. of cases</u>	<u>No. of separate outbreaks</u>
March	2.1	361	11
April	2.85	229	11
May	4.1	83	4
June	6.3	4	1
July	5.6	0	0
August	4.7	0	0
September	5.9	0	0
October	1.2	115	3
November	0.0	225	10
December	0.0	131	2

This seasonal variation, which was particularly well marked in 1961, is in accord with the recent studies made in Nigeria. Infections acquired through the respiratory tract are generally most prevalent during the dry season.



3. vaccination against smallpox

wherever possible vaccination is carried out; a dried preparation is used. The heads of the units appreciate the responsibility for smallpox control which falls on them. Although the health staff, health inspectors and ~~vaccinators~~, are also concerned they tend to operate in the places where population densities are greatest; where M.F.U. teams are working each village is visited, consequently their contribution is principally in the remote areas. The staff in the fixed centres will undertake to maintain the vaccination status in their own localities, what system will be used has not been decided. In 1961 where they did vaccination they were concerned principally with mass campaigns. For example in the area covered by the Kintampo centre, (approximately 2,000 square miles) with a population of about 17,000 the staff vaccinated $12\frac{1}{2}$ thousand people of whom nearly 2,500 were primary vaccinations. M.F.U. last did vaccination in the area in 1954. The work of the year is summarised:-

<u>Unit</u>	<u>Approx. population of area in which vaccination made</u>	<u>Number vaccinated</u>		
		<u>Primary.</u>	<u>Revac.</u>	<u>Total</u>
North East	50,034	7,914	1,742	9,656
North West	136,620	35,555	63,568	99,123
Volta Region	36,714	11,377	21,095	32,472
Brong Ahafo	23,212	5,126	15,261	20,387
Ashanti	8,000	2,490	4,788	7,278
Eastern Region	_____	Nil	_____	_____
	254,580	62,462	106,454	168,916

Summary

The work of M.F.U. in 1961 can be summarised:-

273,116 persons were examined for trypanosomiasis in the field

322 cases were discovered amongst them and were given treatment

281 other new cases of trypanosomiasis attended our centres and itinerant teams for treatment

603 is the total number of new cases of trypanosomiasis treated

145 return cases were also given treatment

1,808,794 persons were examined for yaws on the Initial Treatment Survey, at resurveys or in the course of Long Term Surveillance (Note that in course of campaign of I.T.S. and R.S. a person is generally examined on more than one occasion)

4,643 cases of infectious yaws were treated

20,083 other cases of yaws were treated

606,869 persons received prophylaxis against yaws

168,916 persons were vaccinated against smallpox

1,493 cases of C.S.M. were treated in M.F.U. camps

606 persons were treated for leprosy in M.F.U. clinics

40,744 boys aged 5-15 were examined on ad hoc surveys for bilharziasis in a population of 345,877

1,108 children with measles were treated by M.F.U. staff

608,589 persons were examined in the field for evidence of a number of endemic infections.

In M.F.U. the Ministry of Health have an instrument of considerable potentialities. It is essential that it should be adequately exploited to fulfil its maximum role in the developing health services. This requires that, as far as the present is concerned, the limitations of the organisation are appreciated for it is capable of undertaking the control and investigation of only a handful of infections, and to recognise the danger of imposing on it duties which are beyond its competence; it is necessary to remember that basically the work of M.F.U. is undertaken by medical auxiliaries. In looking to the future the first step is for the health authorities to draw up a list of priorities for endemic disease control and where means of specific and mass control are available these must then be written in the M.F.U's Charter. Training would have to be undertaken to prepare for new work, but granted the right facilities this would not take long.

Given practical directives, continued realistic and patient support until some means of establishing a first class training scheme is evolved, M.F.U. will be able, as professional continuity is achieved, to make an increasingly important contribution to the public health of the nation.

David Scott
SPECIALIST EPIDEMIOLOGIST

APPENDIX I

The individual field units and headquarters sections location of senior staff.

Specialist
& S.G.M.O.
at Kintampo

Headquarters Divisions

Personnel and Establishment	- Senior Executive Officer
Accounts	- Assistant Accountant
Transport including electricity & water supply	- Asst. Road Transport Engineer

Medical Units

N.W.Unit (wa)	- M.O., R.F.S. & R.O.
N.E.Unit (Gambaga)	- M.O., F.S. & 2 R.O.s.
Brong Ahafo Unit (Kintampo)	- M.O. & F.S.
Ashanti Unit (Kumasi)	- R.F.S.
Volta Region Unit(Ho)	- M.O. & F.S.
S.E.Unit (Koforidua)	- M.O., R.F.S. & F.S.

Specialised Units

Simulium Control Unit (Lawra)	- Entomologist & R.O.
Snail Control Unit (wa)	- Biologist

- R.F.S. - Regional Field Supervisor
R.O. - Reclamation Officer
F.S. - Field Superintendent

Appendix 2

Medical Field Units Senior Staff list 1961

NAME

POST

Dr. D. Scott

specialist Epidemiologist

S.G. Medical Officers

Dr. F.J. Wickremasinghe

Special Grade Medical Officer i/c.,
Ash/Brong Ahafo Units (for 6 months
then left on leave prior to retirement)

Dr. F.C. Grant

Special Grade Medical Officer,
(returned from study leave and
joined M.F.U. 2nd September, 1961).

Medical Officers

Dr. E. Onori

M.O. i/c., Volta Region Unit

Dr. G.J. Lavoipierre

M.O. i/c., North East Unit (for 6
months and then transferred to H/q.).

Dr. N.A.J.K. Ruland

M.O. (transferred to M.F.U. on
17/6/61 and took over N.E. Unit).

Dr. W. Korabiewicz

M.O. i/c., North West Unit

Dr. J.O. Koney

M.O. i/c., South East Unit (for 9
months then study leave).

Dr. A.K. Foli

M.O. joined M.F.U. 27/9/61 as
M.O. i/c., South East Unit.

Dr. Y.M. Ali

M.O., B.A.U. for 4 months and
transferred to wa 9/5/61 then left
on study leave on 30/8/61.

Dr. L. Rosei

M.O. Volta Region and took over i/c.,
Ash/Brong Ahafo Units in July, 1961

Entomologist

Dr. G.K. Noamesi

Entomologist i/c., Simulium Control
Unit.

Biologists

Dr. F.S. McCullough

W.H.O. Senior Officer i/c., Snail
Control Unit (for 7 months then
proceeded on leave).

Mr. M.A. Odei

Joined M.F.U. 15/4/61 and took
over Snail Control Unit on 1/8/61.

Regional Field Supervisors

Mr. D.B. Venkumuni

R.F.S. with North West Unit.

Mr. H.A. Ashong

R.F.S. with South East Unit.

Mr. J. Kwaateng

R.F.S. with Ashanti Unit.

Field Superintendents

Mr. E.O.K. Tay	F. S. with Volta Region Unit.
Mr. D. K. Ameyaw	F. S. with B.A. Unit (for 8 months then retired).
Mr. K. Anowih	F. S. with South East Unit.
Mr. R.A. Abatey	F. S. with North East Unit.
Mr. D.E. Sapong	F. S. i/c., Epidemiological Division Headquarters (for 9 months then proceeded on study leave).
Mr. B. Aidoo	F. S. with Brong Ahafo Unit.
Mr. J. Aseidu	F. S. with North West Unit.

Tsetse Control Officer

Mr. D. Farr	Tsetse Control Officer (proceeded on leave prior to retirement on 16/9/61).
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Reclamation Officers

A.C. Nyante M.B.E.	R. O. with Simulium Control Unit.
Mr. J.K. Odobill	R. O. with North East Unit.
Mr. S.K. Sakara	R. O. with North West Unit.
Mr. L.A. Damba	R. O. with North East Unit.

Asst. Rd. Transpt. Engineers

Mr. D.P.K. Quainoo	R.T.E. i/c., Transport H/q's. (for 8 months and proceeded on transfer).
Mr. G.K. Thompson	A.R.T.E. joined M.F.U. on 21st August, 1961.

Asst. Stores Superintendents

Mr. J.L. Quist-Therson	Stores Superintendent at Hq. (for 3 months and proceeded on leave prior to transfer).
Mr. W.H.N. Buckman	A.S.S. at Headquarters (for 9 months).

Senior Exec. Officer

Mr. S. A. Adom	S.E.O. at Headquarters
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Assistant Accountant

Mr. J.L. Minnow	A. A. at Headquarters.
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APPENDIX 3

The Distribution of junior Technical Staff among separate Units

Unit	F.A. I	F.A. II	Est. F.T.	Unest. F.T.	Recorders	Trainees
H.Q.	2	12	1	-	-	-
N.W.	4	10	16	2	-	-
N.E.	7	20	25	8	-	-
B.A.	2	10	16	1	-	-
ASH.	1	14	12	-	-	-
V.R.	1	15	8	-	-	-
S.W.	1	-	-	-	-	-
S.E.	4	17	12	-	-	-
S.C.	-	5	6	-	-	-
B.C.	1	1	-	-	-	-
OTHERS	1	3	2	-	-	-
TOTAL	24	107	98	11	-	-



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			U.S.A.		2632449 and 2678651

